

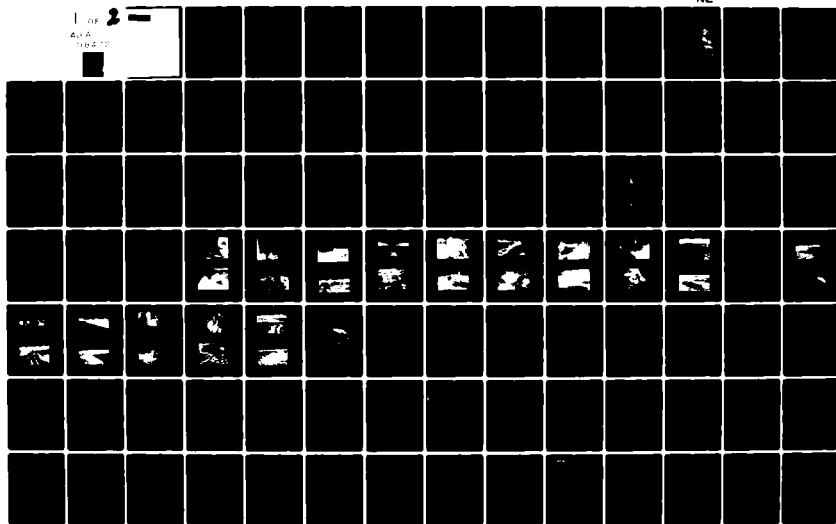
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NATIONAL PROGRAM OF INSPECTION OF NON-FEDERAL DAMS, TENNESSEE. --ETC(U)
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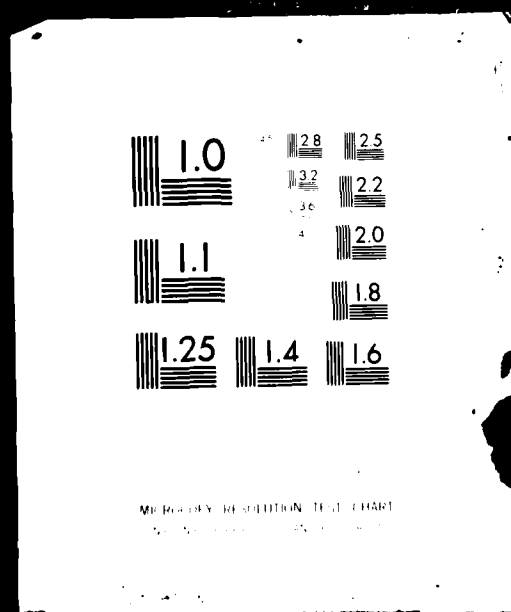
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REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
	AD-A108	172
4. TITLE (and Subtitle) National Program of Inspection of Non-Federal Dams Tennessee. Marys Creek Dam No. 8 (Inventory Number TN 15727) near Cross Roads, Tennessee, Shelby County, TN, Wolf River Basin		5. TYPE OF REPORT & PERIOD COVERED Phase 1 Investigation Report
7. AUTHOR(s)		6. PERFORMING ORG. REPORT NUMBER
		8. CONTRACT OR GRANT NUMBER(s) DACW-62-81-C-0056
9. PERFORMING ORGANIZATION NAME AND ADDRESS Tennessee Department of Conservation Division of Water Resources 4721 Trousdale Dr., Nashville, TN 37220		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS U.S. Army Engineer District, Nashville P.O. Box 1070 Nashville, TN 37202		12. REPORT DATE September, 1981
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)		13. NUMBER OF PAGES
		15. SECURITY CLASS. (of this report) Unclassified
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
16. DISTRIBUTION STATEMENT (of this Report) Approved for public release; distribution unlimited		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Dams Dam Safety National Dam Safety Program Marys Creek Dam No. 8, TN Cross Roads, TN Shelby County, TN Embankments Visual Inspection Structural Analysis		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) Mary's Creek Watershed Dam No. 8 is a curvilinear earthen structure 1120 feet long and 30.0 feet high with a crest width of 12 feet. The upstream and downstream slopes are 1V:2.4H and 1V:3.5H respectively. At normal pool, the 25 acre lake has a storage capacity of 149 acre-feet. At the top of the dam the pool area increases to 45 acres with an impoundage of 380 acre-feet. The drainage area for the lake is 286 acres. It is predominantly pasture and woodland with an average ground slope of approximately 5.6%. The dam is uniform, well grassed, and clear of any deleterious vegetation. The upstream		

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DEPARTMENT OF THE ARMY
NASHVILLE DISTRICT, CORPS OF ENGINEERS
P. O. BOX 1070
NASHVILLE, TENNESSEE 37202

21 SEP 1972

IN REPLY REFER TO

ORND-G

Honorable Lamar Alexander
Governor of Tennessee
Nashville, TN 37219

Dear Governor Alexander:

Furnished herewith is the Phase I Investigation Report on Marys Creek Watershed Dam No. 8 near Crossroads, Tennessee. The report was prepared under the authority and provisions of PL 92-367, the National Dam Inspection Act, dated 8 August 1972.

The report presents details of the field inspection, background information, technical analyses, findings, and recommendations for improving the condition of the dam.

Based upon the inspection and subsequent evaluation, Marys Creek Watershed No. 8 is classified as deficient due to insufficient storage and spillway capacity to pass the one-half probable maximum flood and minor erosion of the dam.

We do not consider this an emergency situation at this time, but the recommendation concerning project modifications to allow safe passage of the design flood and others contained in this report should be undertaken in the near future.

Public release of the report and initiation of public statements fall within your prerogative. However, under provisions of the Freedom of Information Act, the Corps of Engineers is required to respond fully to inquiries on information contained in the report and to make it accessible for review on request.

Your assistance in keeping me informed of any further developments will be appreciated.

Sincerely,

Kenneth W. Ashby LTC
For LEE W. TUCKER
Colonel, Corps of Engineers
Commander

1 Incl
As stated

CF:
Mr. Robert A. Hunt, Director
Division of Water Resources
4721 Trousdale Drive
Nashville, TN 37220

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
TENNESSEE

Name of Dam Mary's Creek
Watershed Dam #8

County Shelby

Stream Unnamed Trib. of
Mary's Creek


Date of Inspection March 11, 1981

This investigation and evaluation was prepared by the
Tennessee Department of Conservation, Division of Water
Resources.

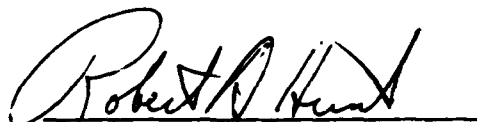
Prepared By:


William Culbert, Jr.
Water Resources Engineer

Approved By:


Edmond B. O'Neill
Chief Engineer
Safe Dams Section

Approved By:


Robert A. Hunt, P.E.
Director, Division of
Water Resources
Tennessee Department
of Conservation

PREFACE

This report is prepared under guidance contained in the Department of the Army, Office of the Chief of Engineers, Recommended Guidelines for Safety Inspection of Dams, for a Phase I investigation. The purpose of the Phase I investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I investigation; however, the investigation is intended to identify any need for such studies.

In the review of this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. Additional data or data furnished containing incorrect information could alter the findings of this report. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structures and may obscure certain conditions which might be detectable if inspected under the normal operating environment of the structure.

The analyses and recommendations included in this report are related to the hazard classification of the structure at the time of the report. Changes in conditions downstream of the dam may change the hazard classification of the structure. A change in hazard classification may in turn change the design flood on which the hydraulic and hydrologic analyses are based and may have a significant impact on the assessment of the safety of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions and is evolutionary in nature. It would be incorrect to assume that the present conditions of the dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspections can there be any chance that unsafe conditions will be detected.

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MARY'S CREEK WATERSHED DAM NO. 8
SHELBY COUNTY
MARCH 27, 1981

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
TENNESSEE

Name of Dam Mary's Creek Watershed Dam No. 8
County Shelby
Stream Unnamed Tributary of Mary's Creek
Date of Inspection March 11, 1981

ABSTRACT

Mary's Creek Watershed Dam No. 8 is a curvilinear earthen structure 1120 feet long and 30.0 feet high with a crest width of 12 feet. The upstream and downstream slopes are 1V:2.4H and 1V:3.5H respectively. At normal pool, the 25 acre lake has a storage capacity of 149 acre-feet. At the top of the dam the pool area increases to 45 acres with an impoundage of 380 acre-feet. The drainage area for the lake is 286 acres. It is predominantly pasture and woodland with an average ground slope of approximately 5.6%

The dam is uniform, well grassed, and clear of any deleterious vegetation. The upstream slope of the embankment shows appreciable sloughing near the principal spillway and especially near the emergency spillway. Scattered minor depressions appear sporadically along the downstream slope, presumably the result of dispersive soil. There are no indications of seepage on the slope or in the area downstream of the dam. No signs of differential settlement or other slope instabilities were observed.

The principal spillway is a reinforced concrete riser with an approximate 3 foot square flow area. It feeds a 24 inch asbestos cement pipe approximately 180 feet long. The drawdown is a 12 inch formed opening controlled by a 12 inch manually operated sliding headgate. According to the owner, the drawdown has always leaked extensively, so to minimize the flow, the inlet was clogged with clay several years ago.

The emergency spillway is an uncontrolled earthen saddle type channel with a trapezoidal cross-section located at the left end of the dam. It has a top width of 57 feet and 2.6 feet of available head (2.9 feet to top of dam). It is well grassed and has a reasonably uniform cross-section. Appreciable erosion occurs near the water surface and along the upstream left side slope, apparently the result of cattle congregating in these areas.

Mary's Creek Watershed Dam #8 is in the "high" hazard potential and "small" size classifications. OCE guidelines require such dams to pass the one-half probable maximum flood ($\frac{1}{2}$ PMF) to full PMF. Hydraulic and hydrologic analyses reveal that the emergency spillway is capable of passing the $\frac{1}{2}$ PMF without causing the dam to overtop provided a dam immediately upstream (Stotts Dam) does not breach during the storm. Further analysis reveals that the upstream dam will overtop under the $\frac{1}{2}$ PMF. Should failure of the upstream dam occur, analysis indicates that Mary's Creek Dam will be overtopped by 0.2 feet for 1.8 hours.

The dam is given a condition classification of "deficient" because of the erosion near the emergency spillway entrance and elsewhere along the upstream slope.

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
MARY'S CREEK WATERSHED DAM NO. 8
SHELBY COUNTY, TENNESSEE

SECTION 1 - GENERAL

- 1.1 Authority - The Phase I inspection of this dam was carried out under the authority of Tennessee Code Annotated, Sections 70-2501 to 70-2530, The Safe Dams Act of 1973, and in cooperation with the U. S. Army Corps of Engineers under the authority of Public Law 92-367, The National Dam Inspection Act.
- 1.2 Purpose and Scope - The purpose of a Phase I investigation is to develop an engineering assessment of the general condition of a dam with respect to safety and stability. This is accomplished by conducting a visual inspection; reviewing any available design and construction data; and performing appropriate hydraulic, hydrologic, and other analyses. A comprehensive description of the Phase I investigation program is given in Recommended Guidelines for Safety Inspection of Dams, by the Department of the Army, Chief of Engineers, Washington, D. C. 20314.
- 1.3 Past Inspections - The site was surveyed by state personnel as part of the pre-inspection reconnaissance on February 18, 1981.
- 1.4 Details of Inspection - The Phase I inspection of Mary's Creek Dam No. 8 was conducted on March 11, 1981. The weather was sunny and breezy with a temperature of 70° F.
- 1.5 Inspection Team Members - The field inspection was conducted by the following State personnel:
- Edmond O'Neill, Chief Engineer
George Moore, Regional Engineer
William Culbert, Jr., Regional Engineer

SECTION 2 - PROJECT DESCRIPTION

- 2.1 Location - The dam is located in Shelby County, Tennessee, 1.5 miles southeast of the Fisherville community at mile 1 of an unnamed tributary confluent with Mary's Creek at approximate mile 5. The site is shown on the USGS Eads quadrangle map (416NW) at 35°08'45" north latitude and 89°38'59" west longitude. (See Appendix B for location maps).
- 2.2 History of Project - Mary's Creek Watershed Dam #8 was constructed as a flood retention structure in 1954 by McComick Construction Company of Covington, Tennessee (no longer in business) under the authority of the Pilot Watershed Program established by an act predating Public Law 566. The project was sponsored by Shelby and Fayette County Soil Conservation Districts with assistance from the Wolf River Watershed Association, the SCS, and various other agencies of the Department of Agriculture. The property is owned by L.E. Bryant, and the Shelby and Fayette County Soil Conservation Districts are responsible for operating and maintaining the site with labor, materials, and funding provided by the Wolf River Watershed Association, county courts, and local landowners.

In 1957, severe jugging on the downstream slope provided sufficient impetus for the SCS to have 3 feet of fill material removed from the surface of the slope and replaced with new material. In the early 1960's, the SCS implemented an alteration to the dam with the help of farm labor. The riser and corresponding normal pool elevation were raised 5 feet. The dam height was raised 4 feet by the addition of new fill material over the downstream slope and crest. This required that the principal spillway culvert be extended downstream into the plunge pool with an additional 16 foot section of asbestos cement pipe.

- 2.3 Upstream Dam - Stotts Dam is located approximately 800 feet upstream of Mary's Creek Lake. It is owned by Cedar Hill Farms (Tolly Murff and T. G. Barbee, principal shareholders). The dam is 17 feet high, 422 feet long, with a maximum impounding capacity of 54 acre-feet. The drainage area is 41 acres.

Hydraulic analysis indicates that the $\frac{1}{2}$ PMF will overtop the dam. Routing the breach hydrograph from Stotts, downstream, indicates that the Mary's Creek Dam will also be overtopped under this flood condition. Data for Stotts Dam is given in Appendices A, B, C, D, and F following data for Mary's Creek.

- 2.4 Size and Hazard Classification - Based on a structural height of 30 feet and a maximum storage capacity of 380 acre-feet, the dam is given a size classification of "small". A federal hazard classification of "high" was chosen for the dam because a sudden failure of the structure could result in the deaths of several persons living in the two homes near the channel approximately 4600 feet downstream of the dam.

2.5 Description of Dam and Appurtenances

- 2.5.1 Embankment - The dam is a curvilinear earthen structure 1120 feet long and 30 feet high with a crest width of 12 feet. The upstream and downstream slopes are 1V:2.4H and 1V:3.5H respectively. The dam crest elevation varies from 369.6 feet to 371.4 feet msl. (Elevations referenced to pool surface as given on USGS quadrangle.)

Review of geologic quadrangle maps of the area and the regional state geologic map indicate that the area is overlain predominantly with Memphis and Grenada soils derived from deep Loess brown loam. Collins and Falayia are the principal bottom soils. (Loess soils consist of clayey and sandy silt, gray to brown, with a maximum thickness of 20 to 35 feet in the Wolf River tributaries area with a 40-50 foot thick fluvial formation deep to this.) Being wind blown material, the Loess lays in about equal thickness through extensive changes in elevation, so deeper formations cannot be identified without borings. No boring profiles are provided in the design drawings.

The design specifies a cutoff trench with a 10 foot base and 1:1 side slopes to be excavated along the centerline of the dam to a low point elevation approximately equal to that of the principal spillway outlet invert. Sixty feet upstream of the outlet is the design location of an SCS box type embankment drain, 4 feet square by 550 feet long. A 6" helical corrugated metal pipe discharges to the right of the principal spillway.

2.5.2 Service Spillway and Drawdown - The principal spillway consists of a 17 foot tall reinforced concrete riser with an approximately 3 foot square flow area. The riser feeds a 24 inch asbestos cement culvert 180 feet long. Three 8.5' X 12.5' antiseep collars are located along the culvert on 26 foot centers. The drawdown is a 12 inch formed opening at the upstream base of the riser controlled by a 12 inch manually operated gate valve (see photo no. 7).

2.5.3 Emergency Spillway - The emergency spillway is an uncontrolled saddle type channel located at the left end of the dam. It has a trapezoidal cross-section with a 25 foot base width and approximately 1V:7H side slopes. The spillway has 2.6 feet of available head within its horizontal boundaries but provides 2.9 feet of head at what is considered the effective low point in the dam crest, elevation 369.6 (see sheet 5 of sketches).

Approximately 106 feet to the right of the dam is a small open channel following the natural contour of the abutment. It has a width of 20 feet at the top of the dam with 1.1 feet of available head. The channel was apparently excavated as part of a terracing system (see photo no. 1). The hydraulic capacity of the channel was considered in the flood routing.

2.6 Downstream Channel - The natural channel downstream of the embankment lies on approximately a 0.5% slope. It is 10 to 12 feet wide and 5 to 8 feet deep. It can be approximated as a trapezoidal channel with a relatively flat base and side slopes ranging from 1:1 to almost vertical.

2.7 Reservoir and Drainage Area - At normal pool the reservoir has a surface area of 24.8 acres and a storage capacity of 149 acre-feet. At maximum pool, the surface area is 45 acres with 380 acre-feet of total storage.

The drainage area of the basin is 286 acres (245 acres excluding drainage area of Stotts Lake Dam) with an average ground slope of approximately 5.6%. The area is predominantly woodland and pasture with major surface soils of Memphis, Loring, and Grenada.

SECTION 3 - FINDINGS

3.1 Visual Inspection

- 3.1.1 Embankment - The embankment is free of trees and other woody vegetation except for one large bush at the left downstream toe of the linear portion of the dam and a few small coniferous seedlings.

The structure is free of observable seepage with no noticeable wet areas along the downstream slope. There are, however, some small inactive depressions on the downstream slope. They are presumably the result of cattle traffic or poor grading during construction.

Immediately downstream of the dam near mid-section a terrace excavation has left a 100 square foot low area 2 feet deep with a gully trench that tapers away to an intersection with the plunge pool. The depressed area has a wet base and the gully contains a small amount of pooled water near its downstream end, apparently the result of surface runoff. If it is the result of seepage, there was no observable flow and it would appear to be of little consequence.

The upstream slope of the dam is significantly eroded in the area of the riser and at the emergency spillway entrance. Both upstream and downstream slopes have a good Bermuda grass cover (see photo nos. 6, 9, and 10).

The downstream slope of the dam is flat and well grassed with no significant deleterious vegetation. It exhibits no signs of seepage or differential settlement.

The crest of the dam is flat, uniform, and well grassed.

- 3.1.2 Service Spillway and Drawdown - The spillway riser appears to be in good condition as viewed from the dam. There appears to be no broken or lost timbers from the anti-vortex baffle or floor cap (see photo no. 7). The spillway outlet is submerged in the plunge pool and was inaccessible for inspection (see photo nos. 13 and 14).

According to the owner, the drawdown leaked extensively for several years after construction. The valve was considered to be poorly designed and its use was discontinued by the SCS soon afterwards. To remedy the leakage problem, clay was dumped at the inlet. A leakage flow of only a few gallons per minute was observed at the outlet during the inspection (see photo no. 13).

- 3.1.3 Emergency Spillway - The emergency spillway has a reasonably uniform cross-section. It has a good grass cover and is clear of undesirable vegetation. There is appreciable erosion on the left side slope from near the water surface to the control section (see photo nos. 17 and 18). Erosion at the upstream right side slope is more severe but represents little danger to the structure because it occurs on the end wall upstream of the embankment (see photo nos. 9 and 10).
- 3.1.4 Downstream Channel - The stream channel downstream of the dam is adequately protected with natural cover. Four and six inch median diameter trees grow along most of the bank (see photo nos. 11 and 12). The side slopes of the channel are relatively steep and the base is flat with no significant erosion.
- 3.2 Review of Data - Information reviewed for the preparation of the report includes the Watershed Work Plan for Mary's and Sand Creek tributaries and the SCS design plans. Information from the review of this data is incorporated into the report.
- 3.3 Static and Seismic Stability Analysis - The dam is in Seismic Zone 3, indicating that damage from seismic activity would be major. The actual margin of safety for static stability was not determined because an analytical stability analysis is beyond the scope of this report. Consequently, the assessment of embankment stability must be based on visual evidence and engineering judgment. No signs of instability were observed.

- 3.4 Hydraulic and Hydrologic Analysis - According to OCE guidelines, dams in the small size and high hazard categories are required to pass the one-half probable maximum flood ($\frac{1}{2}$ PMF) to the full PMF.

Hydraulic and hydrologic analysis of Mary's Creek drainage area under the influence of the $\frac{1}{2}$ PMF, assuming no breach of the upstream dam, indicates that the Mary's Creek Reservoir has sufficient flood storage to contain the $\frac{1}{2}$ PMF providing 0.71 feet of freeboard.

The dam will overtop by a maximum of 0.2 feet for 1.8 hours under the $\frac{1}{2}$ PMF incorporating failure of Stotts Lake Dam. (See Appendix A and Appendix F for hydrologic details of Stotts Dam).

3.5 Conclusions and Recommendations

- 3.5.1 Conclusions - The dam shows no significant signs of structural instability.

The dam is located in Seismic Zone 3, indicating that risk of damage due to seismic activity is major.

Analysis indicates that the emergency spillway is inadequate to pass the $\frac{1}{2}$ PMF in addition to a failure of the Stotts Dam upstream. This spillway is not considered to be seriously inadequate, however, because the depth and duration of overtopping are not considered great enough to fail the dam.

There is appreciable sloughing of a few areas on the upstream slope.

The dam is given a condition classification of "deficient" because of the minor erosion occurring on the upstream slope and because of the marginal spillway adequacy.

- 3.5.2 Recommendations - The Shelby County Soil Conservation District should:

a. Provide erosion protection for the upstream slope and repair any other areas of erosion occurring on the dam.

b. Develop an emergency action plan to warn downstream residents in the event a serious problem develops with the dam.

c. Establish a program of regular inspection and maintenance.

d. A qualified engineer should be retained to:

1. Evaluate the stability of the embankment under seismic loading condition.

2. Make recommendations for restoring the lake drawdown facilities to an operable condition.

3. Make recommendations to expose the principal spillway and embankment drain outlets.

SECTION 4 REVIEW BOARD FINDINGS

The Interagency Review Board for the National Program of Inspection of Non-Federal Dams met in Nashville on 30 July 1981 to examine the technical data contained in the Phase I investigation report on Mary's Creek Watershed Dam No. 8. The Review Board considered the information and recommended that (1) the data relating to the failure of Stott's Dam through structural failure alone or through failure during the $\frac{1}{2}$ PMF should be included in the report, (2) the report should conclude that the dam would probably not fail if it were overtopped by 0.2 ft. for 1.8 hours during the $\frac{1}{2}$ PMF, (3) a qualified engineer should be engaged to perform an embankment stability analysis to determine if the dam meets seismic stability requirements, and (4) recommendation "d" should be revised to include the services of a qualified engineer to investigate the feasibility of lowering the water level in the stilling basin. The engineer should also investigate and make recommendations for the repair of the drawdown facilities. They agreed with other report conclusions and recommendations. A copy of the letter report presented by the Review Board is included in Appendix G.

APPENDIX A
DATA SUMMARY

MARY'S CREEK NO. 8

APPENDIX A
DATA SUMMARY

A.1 Dam

A.1.1 Type - Earthfill

A.1.2 Dimensions and Elevations

- a. Crest length - 1120 feet
- b. Crest width - 12 feet
- c. Height - 30.0 feet (downstream pipe invert to low point in crest)
- d. Crest elevation (low point) - 369.6
- e. Upstream slope - 2.4H:1V
- f. Downstream slope - 2.5H:1V
- g. Size classification - Small

A.1.3 Zones, Cutoffs, Grout Curtains - The embankment is comprised of homogeneous fill material. A cutoff trench was designed to be constructed along the dam centerline with a base width of 10 feet, 1:1 side slopes, and a maximum depth approximately equal to that of the invert of the principal spillway outlet.

A.1.4 Instrumentation - None

A.2 Reservoir and Drainage Area

A.2.1 Reservoir

a. Normal Pool

- 1) Elevation - 363 (msl)
- 2) Surface area - 24.8 acres (0.039 mi²)
- 3) Capacity - 149 acre-feet
- 4) Length - 2130 feet

b. Maximum Pool (top of dam)

- 1) Elevation - 369.6 (msl)
- 2) Surface area - 45 acres
- 3) Total capacity - 380 acre-feet

A.2.2 Drainage Area

- a. Size - 286 acres (total)
245 acres (excluding drainage area of
Stotts Lake upstream)
- b. Average ground slope - Approximately 5.6%
- c. Soils - Memphis 64%(B), Loring 22%(B),
Grenada 14%(C)
- d. Land use - 50% pasture, 35% woodland,
12% water, 3% residential
- e. Runoff (AMC II)
 - 1) PMF - 24.7 inches
 - 2) $\frac{1}{4}$ PMF - 12.5 inches
 - 3) 100 year flood - 2.3 inches

A.3 Outlet Structures

A.3.1 Service Spillway

- a. Type - Asbestos cement circular culvert
- b. Size - 24 inch inside diameter
- c. Pipe gradient - 3.6%
- d. Drawdown - 12 inch formed opening controlled
by 12 inch manually operated sliding
headgate

A.3.2 Emergency Spillway

- a. Type - Open channel saddle; trapezoidal
cross-section
- b. Crest elevation - 366.9 feet msl (effective)
- c. Size - Base-25 feet
Side slopes-7H:1V
T-57 feet
Head-2.9 feet
- d. Maximum capacity - 360 cfs

A.4 Historical Data

- A.4.1 Construction Date - Originally constructed
in 1951; renovated in approximately 1958
- A.4.2 Designer - Soil Conservation Service
- A.4.3 Builder - Originally McComick Construction
Company, Covington, Tennessee; alteration
by Rollin Wiggs of Cedar Hill Farms,
Memphis, Tennessee
- A.4.4 Owner - L. E. Bryan

A.4.5 Previous Inspections - State personnel performed pre-inspection reconnaissance survey on February 18, 1981.

A.4.6 Seismic Zone - 3

A.4.7 Operation and Maintenance - The Shelby County Soil Conservation District is responsible for operation and maintenance of the structure by open market purchase with limited funds provided primarily by Shelby and Fayette County courts.

A.5 Downstream Hazard Data

A.5.1 Downstream Hazard Classification - High

A.5.2 Persons in Likely Floodpath - 10 (estimate)

A.5.3 Downstream Property - 2 homes and 1 large horse stable and track 4600 feet downstream.

A.5.4 Warning Systems - None

STOTTS LAKE DAM

APPENDIX A DATA SUMMARY

A.1 Dam

A.1.1 Type - Earthfill

A.1.2 Dimensions and Elevations

- a. Crest length - 422 feet
- b. Crest width - 7 feet
- c. Height - 17 feet
- d. Crest elevation (low point) - 388.9 feet msl
- e. Upstream slope - 1.2H:1V (potential for error is great due to extensive sloughing)
- f. Downstream slope - 1.6H:1V
- g. Size classification - Small

A.1.3 Zones, Cutoffs, Grout Curtains - There is no readily available means of confirming cutoff trench construction. No engineering supervision was provided during construction and the owner has no recollection or records of the work performed, but because the SCS provided technical assistance, a cutoff trench would certainly have been recommended.

A.1.4 Instrumentation - None

A.2 Reservoir and Drainage Area

a. Normal Pool

- 1) Elevation - 387 feet msl
- 2) Surface area - 6.6 acres
- 3) Storage capacity - 40 acre-feet
- 4) Reservoir length - 730 feet

b. Maximum Pool (designated top of dam)

- 1) Elevation - 388.9 feet msl
- 2) Surface area - 8 acres
- 3) Total capacity - 54 acre-feet

A.2.2 Drainage Area

- a. Size - 41 acres (0.064 mi²)
- b. Average ground slope - Approximately 5.6%
- c. Soils - Memphis (60%), Grenada (25%), Loring (15%)

- d. Land use - Pasture (64%), wooded (18%),
water (16%), residential or
hard surface (2%)
- e. Runoff (AMC II)
 - 1) PMF - 25.3 inches
 - 2) $\frac{1}{2}$ PMF - 12.6 inches
 - 3) 100 year - 2.6 inches

A.3 Outlet Structures

A.3.1 Service Spillway

- a. Type - Open channel parabolic
- b. Size - T = 30 feet
Hd = 1.9 feet
- c. Crest elevation - 387 feet msl
- d. Maximum capacity - 150 cfs (HEC-1 inter-
polates 161 cfs)

A.3.2 Emergency Spillway - Service/emergency combination (see above)

A.4 Historical Data

A.4.1 Construction Date - 1951

A.4.2 Design - SCS technical assistance

A.4.3 Builder - Farm labor and equipment were used

A.4.4 Owner - Cedar Hill Farms (T. G. Barbee and Tolly Murff are principal or sole shareholders)

A.4.5 Previous Inspections - None. Dam was not previously on state or federal inventory.

A.4.6 Seismic Zone - 3

A.5 Downstream Hazard Data

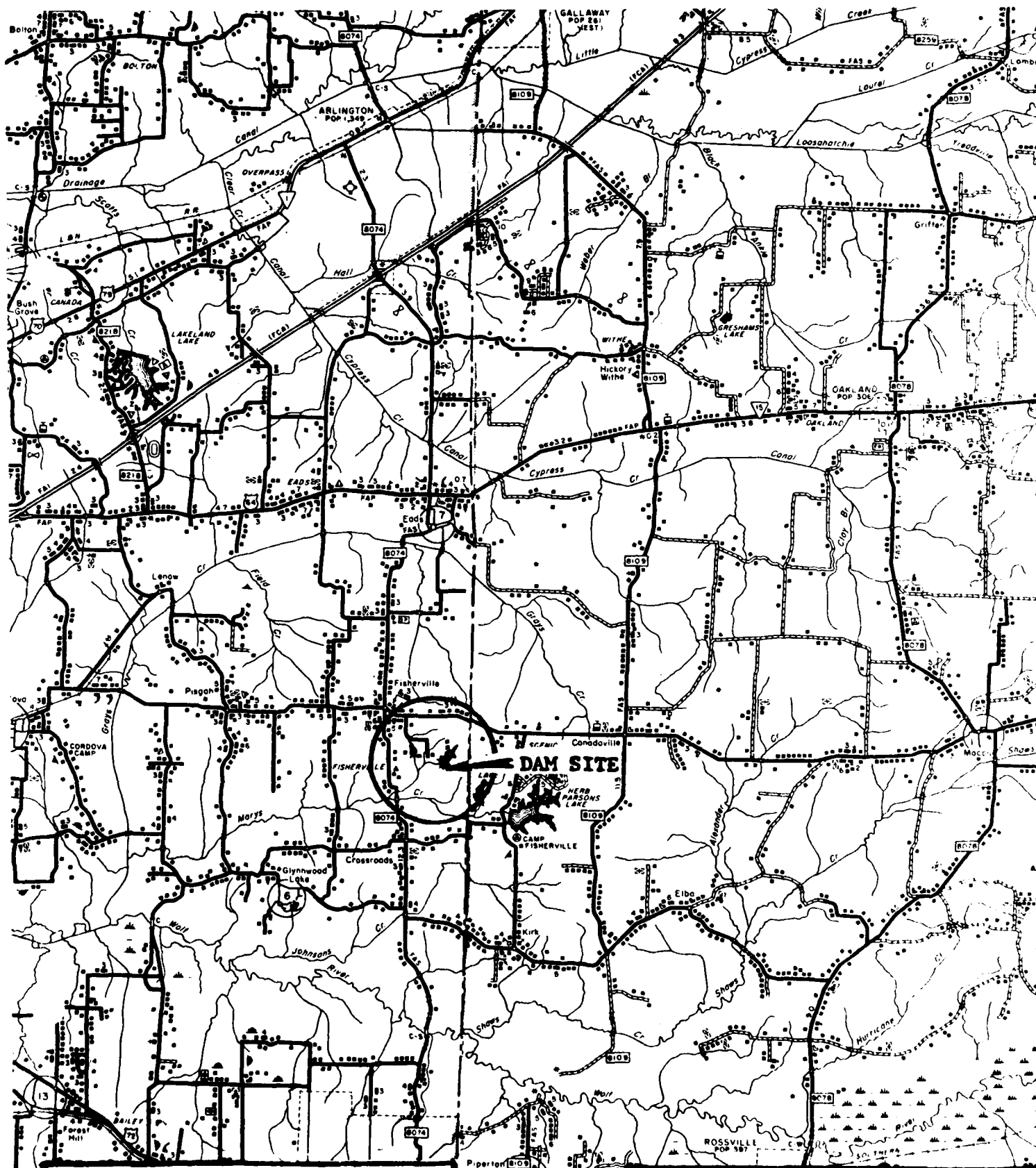
A.5.1 Downstream Hazard Classification - High

A.5.2 Persons in Likely Flood Path - 10 (est.)

A.5.3 Downstream Property - 2 homes, 1 horse stable and track approximately 7,600 feet downstream

A.5.4 Warning System - None

APPENDIX B
SKETCHES AND LOCATION MAPS



SHELBY COUNTY



SCALE

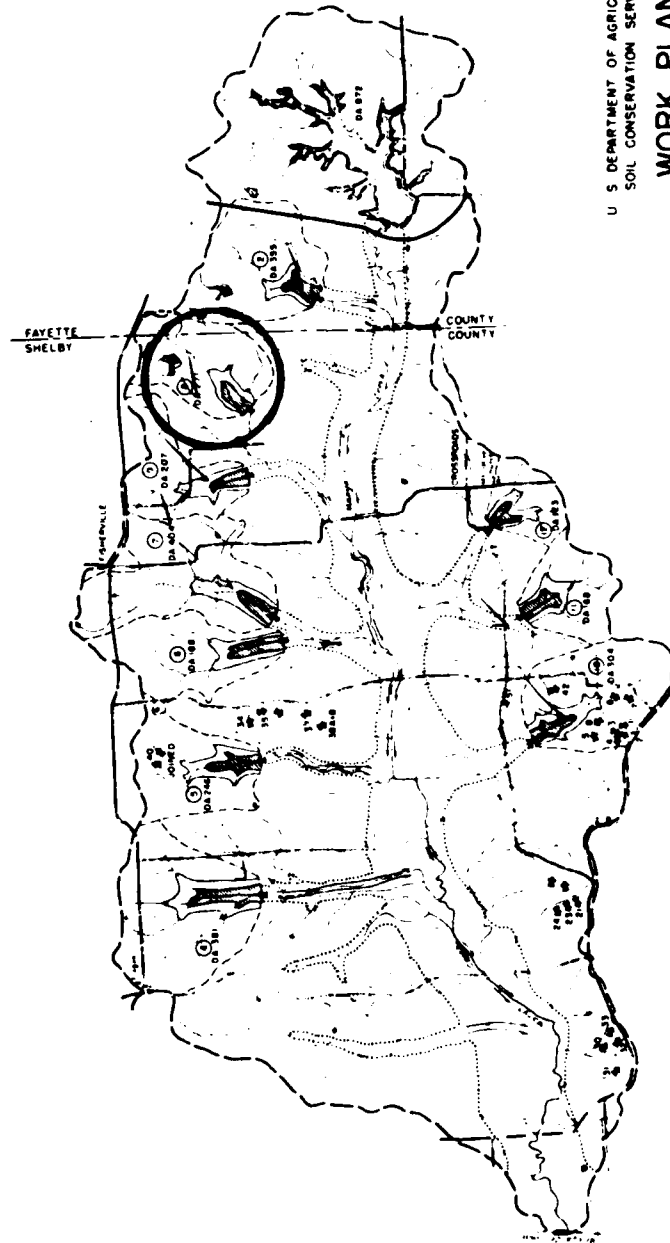
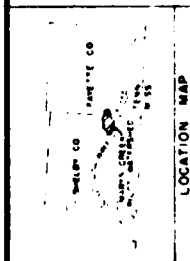
4 MILES

FAYETTE COUNTY



SCALE

4 MILES



LEGEND

- PAVED ROADS
- IMPROVED ROADS
- UNIMPROVED ROADS
- DRAINAGE
- WATERSHED BOUNDARY
- EXISTING POND OR RESERVOIR
- DETENTION STRUCTURE
- DRAINAGE AREA BOUNDARY - SPECIAL STRUCTURES
- AGRICULTURAL AREA
- FLOOD PLAIN BOUNDARY
- STABILIZING AND SEDIMENT CONTROL MEASURE
- STREAM CHANNEL IMPROVEMENT

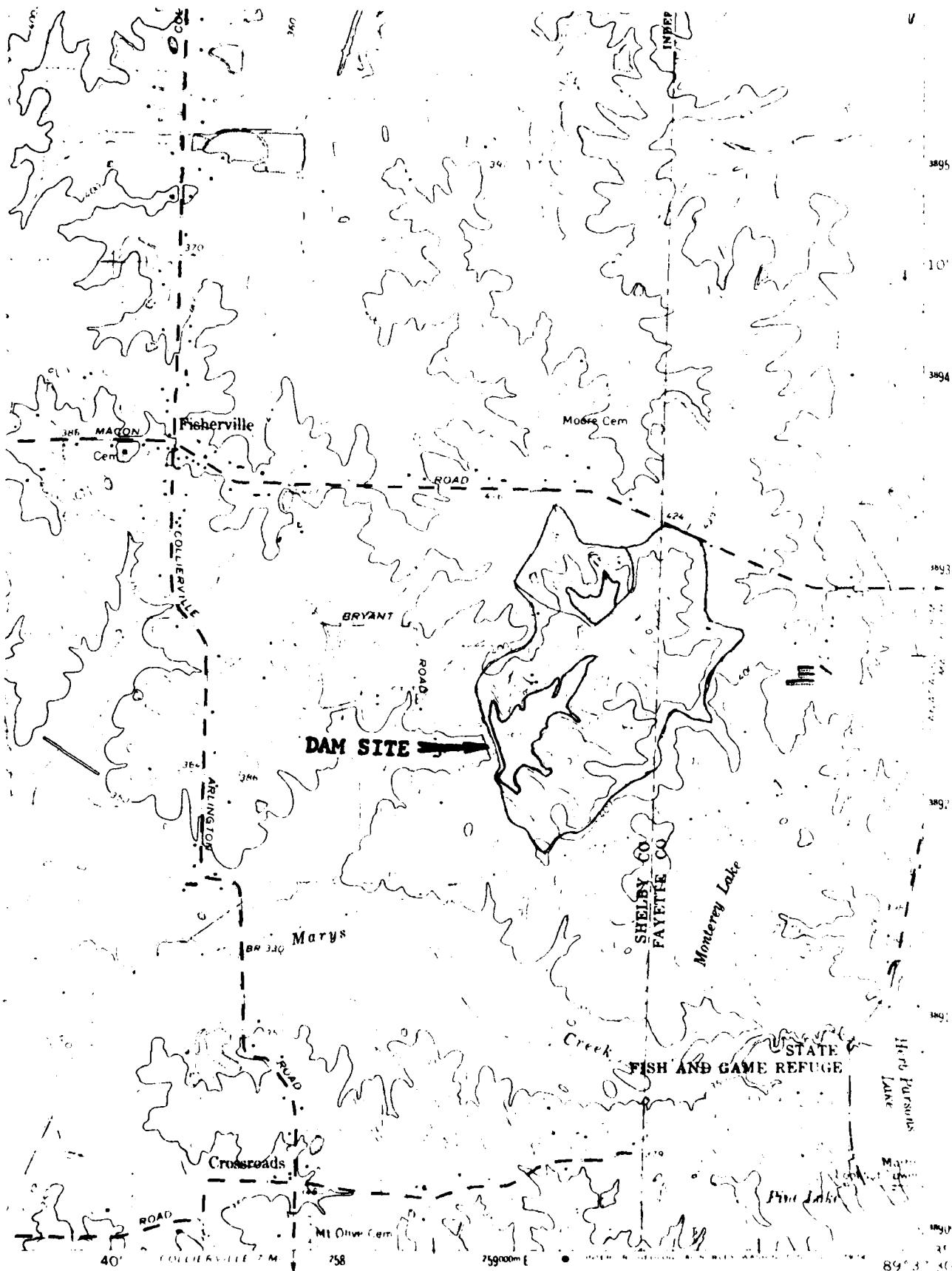
U S DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

WORK PLAN

MARYS CREEK PILOT WATERSHED
A PORTION OF
FAYETTE AND SHELBY COUNTIES
SOIL CONSERVATION DISTRICTS
TENNESSEE

1 MILE

JANUARY 1954

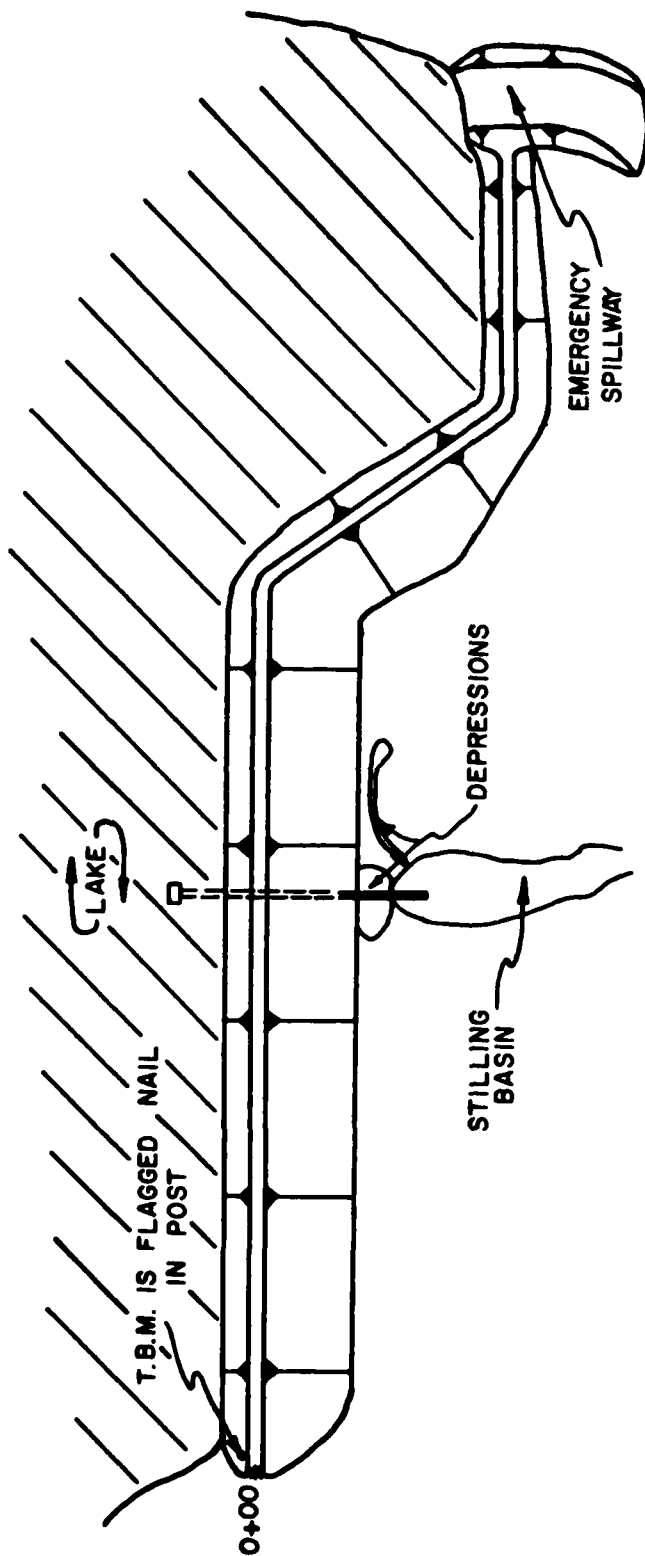


1 MILE

ROAD CLASSIFICATION

1. Primary Road
 2. Secondary Road
 3. Tertiary Road
 4. Quaternary Road
 5. Unimproved Road

EADS QUADRANGLE
 10' CONTOUR INTERVAL
 416 NW
 PHOTO REVISED 1973



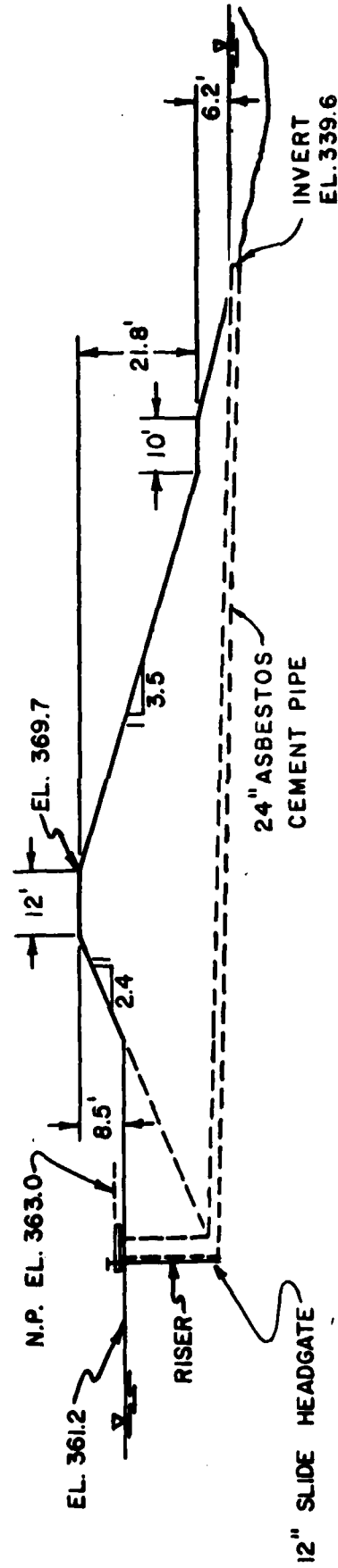
GENERAL PLAN
N.T.S.

MARYS CREEK DAM
8

DRAWN BY: G.A.D.

DATE: 5/4/81

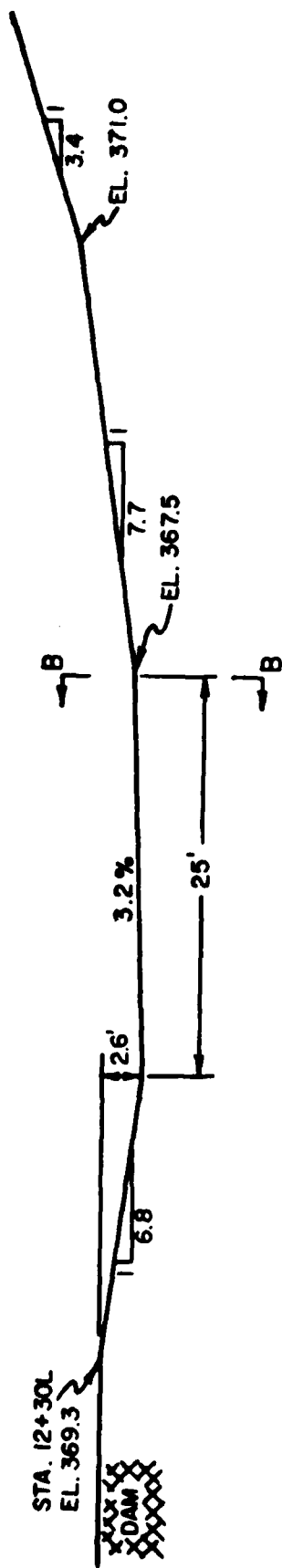
SHEET: 1 OF 5



MAXIMUM SECTION @ STA. 5+00L
SCALE: 1" = 30'

NOTE: ELEVS. REFERENCED TO
N.P. AS GIVEN ON U.S.G.S.
TOPOGRAPHIC MAP.

MARYS CREEK DAM	
#8	
DRAWN BY: G.A.D.	
DATE: 5/4/81	
SHEET: 2 OF 5	



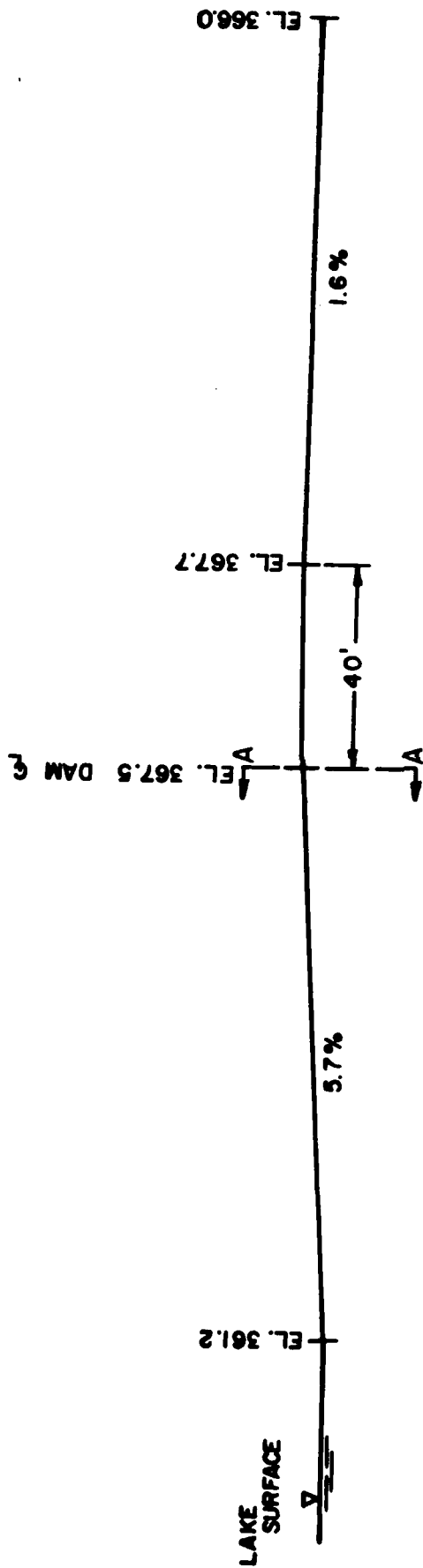
EMERGENCY SPILLWAY CONTROL SECTION A-A
SCALE: 1" = 10'

MARYS CREEK DAM
8

DRAWN BY: G.A.D

DATE: 4/30/81

SHEET: 3 OF 5



SECTION B-B
EMERGENCY SPILLWAY PROFILE
 SCALE: 1"=30'

MARYS CREEK DAM #8	DRAWN BY: G.A.D. DATE: 4/30/81 SHEET: 4 OF 5
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MARYS CREEK DAM # 8

DRAWN BY: G.A.D.

DATE: 5/4/81

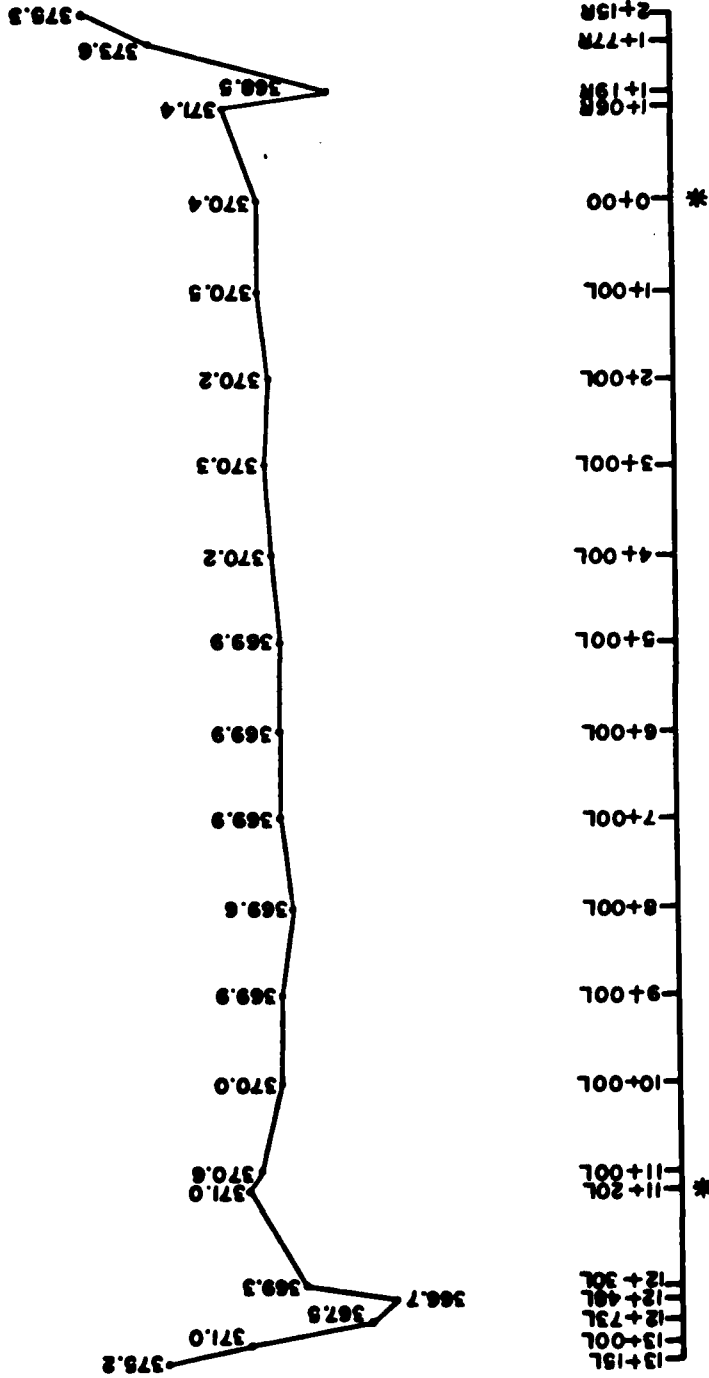
SHEET: 5 OF 5

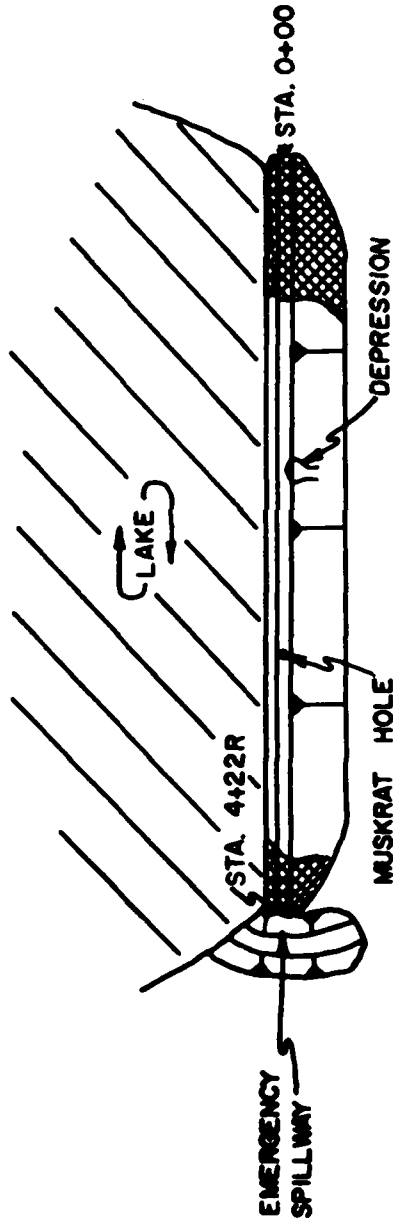
CREST & PROFILE

H. SCALE: 1" = 200'

V. SCALE: 1" = 5'

END OF DAM





NOTE:  - NEW FILL MATERIAL

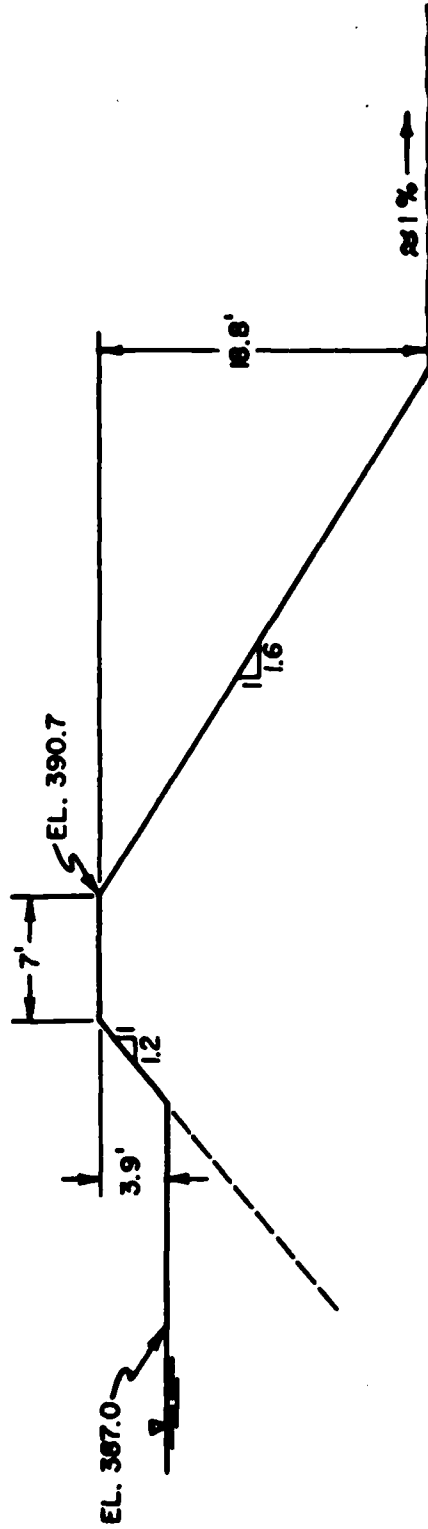
GENERAL PLAN
SCALE: 1" = 100'

STOTTS LAKE
DAM

DRAWN BY: G.A.D.

DATE: 5/19/81

SHEET: 1 OF 5



MAXIMUM SECTION @ STA 2+70R

SCALE: 1"=10'

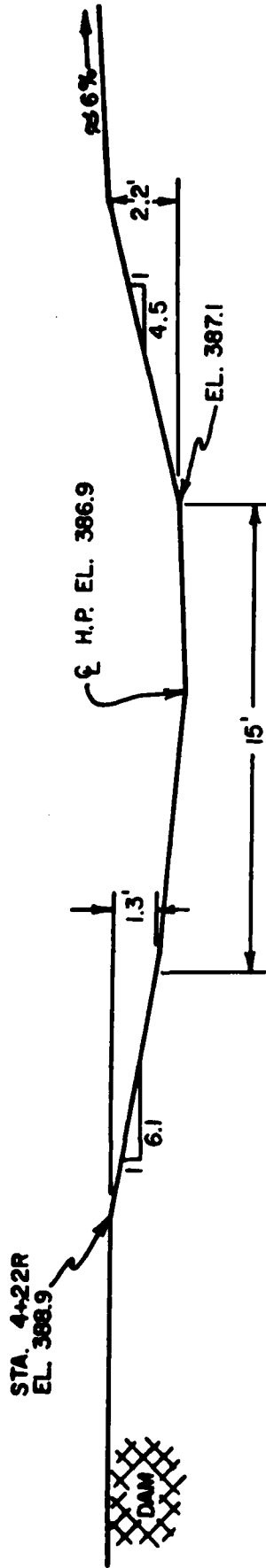
NOTE: ELEVS. REFERENCED TO
APPROX. LAKE SURFACE EL.
387 AS SHOWN ON USGS
QUADRANGLE MAP.

STOTTS LAKE
DAM

DRAWN BY: G.A.D.

DATE: 5/19/81

SHEET: 2 OF 5



EMERGENCY SPILLWAY CONTROL SECTION

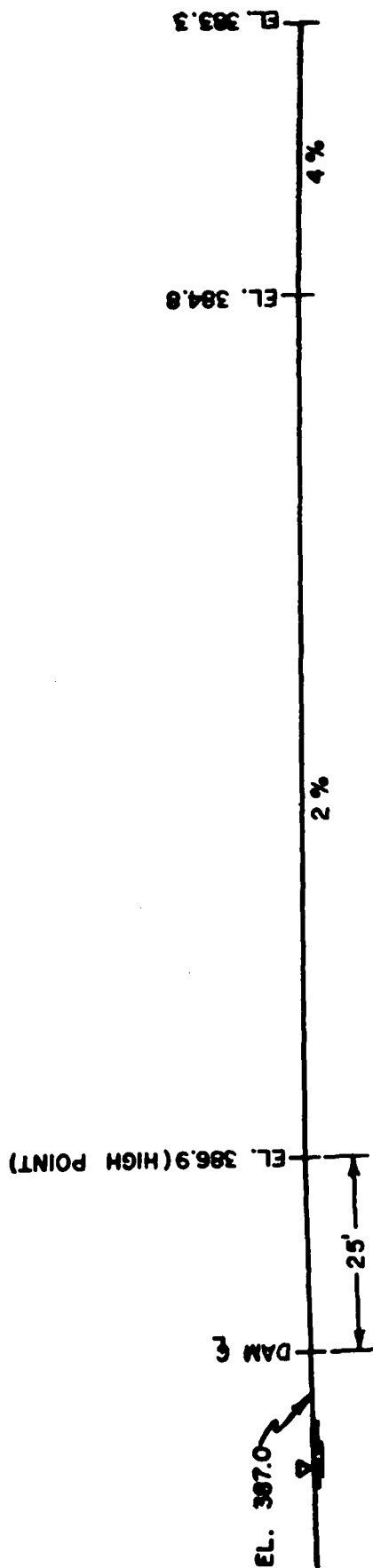
SCALE: 1" = 5'

STOTTS LAKE
DAM.

DRAWN BY: G.A.D.

DATE: 5/20/81

SHEET: 3 OF 5

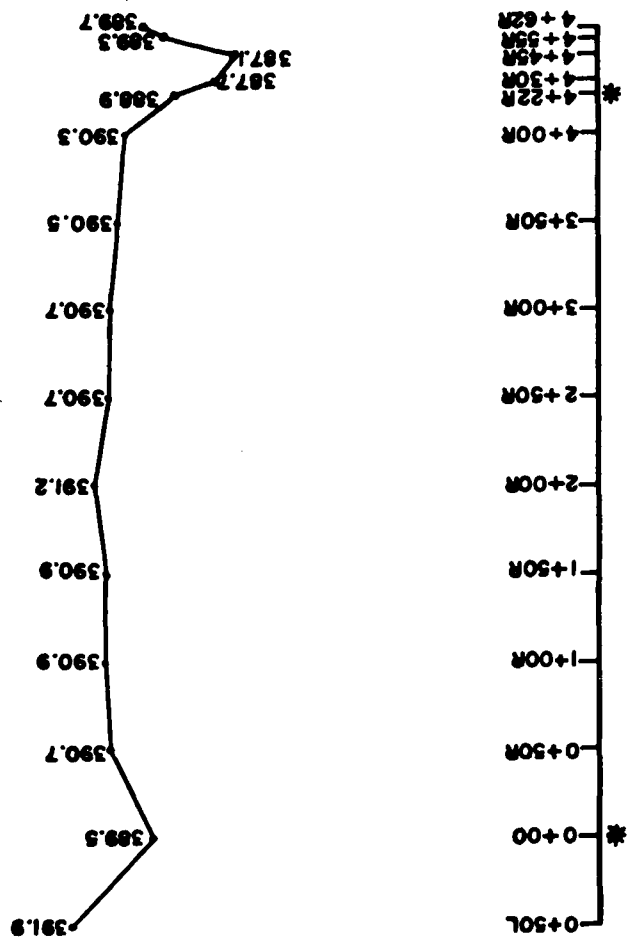


EMERGENCY SPILLWAY PROFILE

SCALE: 1" = 20'

STOTTS LAKE DAM	DRAWN BY: G.A.D.
DATE: 5/20/81	SHEET: 4 OF 5

STOTTS LAKE DAM	
DRAWN BY: G.A.D.	DATE: 5/20/81
SHEET: 5 OF 5	



#END OF DAM

APPENDIX C
PHOTOGRAPHIC RECORD

Mary's Creek No. 8

Photographic Record

- Photo No. 1 - Aerial shot.
- Photo No. 2 - Aerial shot showing Stotts Lake Dam upstream of Mary's Creek.
- Photo No. 3 - Aerial shot looking downstream.
- Photo No. 4 - Aerial shot looking upstream.
- Photo No. 5 - Downstream slope of dam from left.
- Photo No. 6 - Downstream slope and curvilinear portion of dam.
- Photo No. 7 - Riser.
- Photo No. 8 - Downstream of toe showing excavated drainage ditch.
- Photo No. 9 - Sloughing along upstream slope just right of emergency spillway.
- Photo No. 10 - Sloughing along entrance channel of emergency spillway.
- Photo No. 11 - Stilling basin from crest.
- Photo No. 12 - Downstream channel.
- Photo No. 13 - Stilling basin from downstream.
- Photo No. 14 - Stilling basin.
- Photo Nos. 15 & 16 - Pooled water in downstream section of drainage ditch shown in Photo No. 8.
- Photo No. 17 - Entrance channel of emergency spillway.
- Photo No. 18 - Exit channel of spillway.



PHOTO NO. 1



PHOTO NO. 2



PHOTO NO.3



PHOTO NO.4

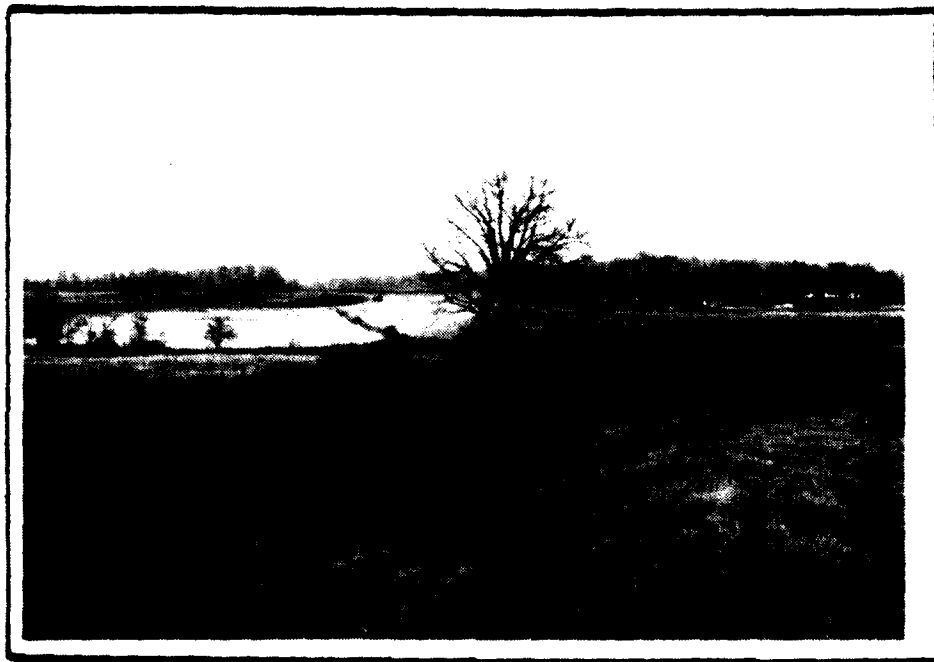


PHOTO NO.5



PHOTO NO.6



PHOTO NO. 7



PHOTO NO. 8



PHOTO NO. 9



PHOTO NO. 10



PHOTO NO. 11



PHOTO NO. 12



PHOTO NO.13



PHOTO NO.14



PHOTO NO .15

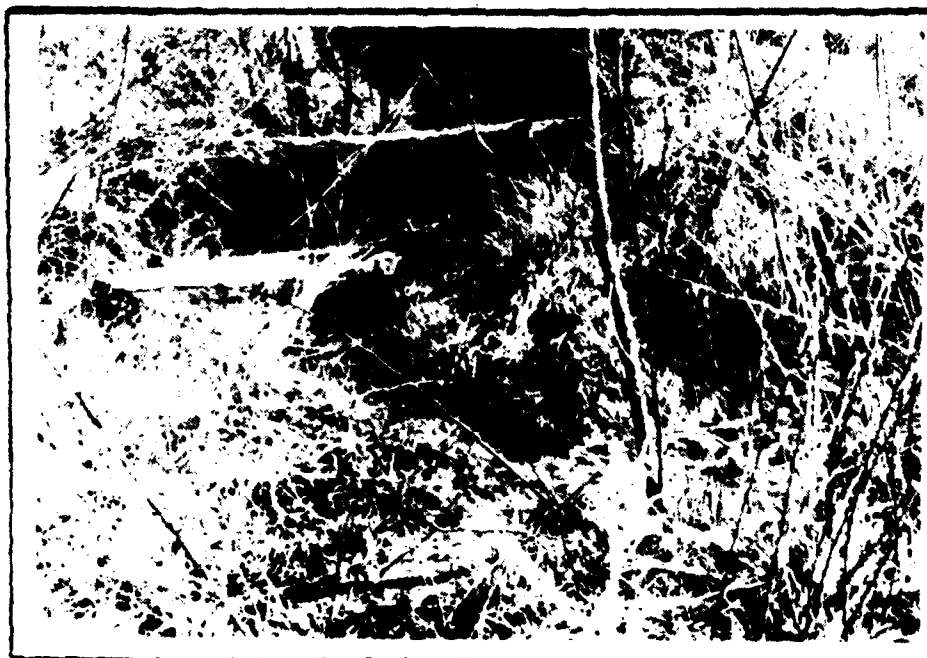


PHOTO NO .16

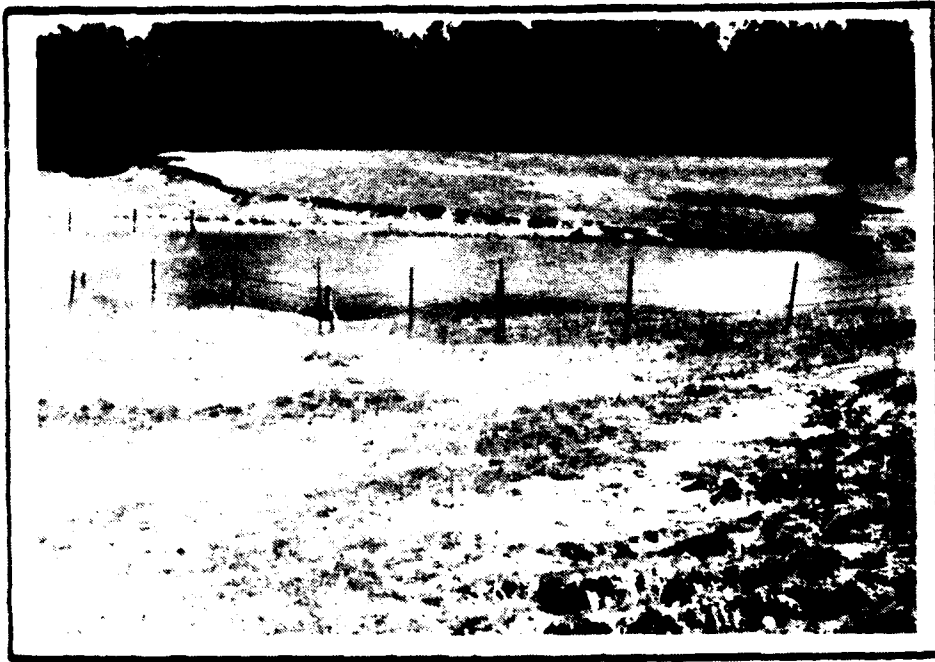


PHOTO NO .17



PHOTO NO .18

Stotts Lake Dam
Photographic Log

- Photo No. 1 - Downstream slope at left end of dam showing new fill material.
- Photo No. 2 - Downstream slope looking left from mid-section.
- Photo No. 3 - Downstream slope from emergency spillway exit channel.
- Photo No. 4 - Crest of dam looking right from near mid-section.
- Photo No. 5 - Upstream slope of dam showing extensive sloughing.
- Photo No. 6 - Upstream slope at left end of dam.
- Photo No. 7 - Depression on downstream side of crest.
- Photo No. 8 - Muskrat hole on crest.
- Photo No. 9 - Sloughing along upstream slope (turned 90°).
- Photo No. 10 - Longitudinal surface crack along upstream slope of new fill material at left end of dam.
- Photo No. 11 - Spillway, from right of dam.
- Photo No. 12 - Spillway, looking upstream.
- Photo No. 13 - Eroded area along spillway channel approximately 150 feet downstream of dam.



PHOTO NO.1

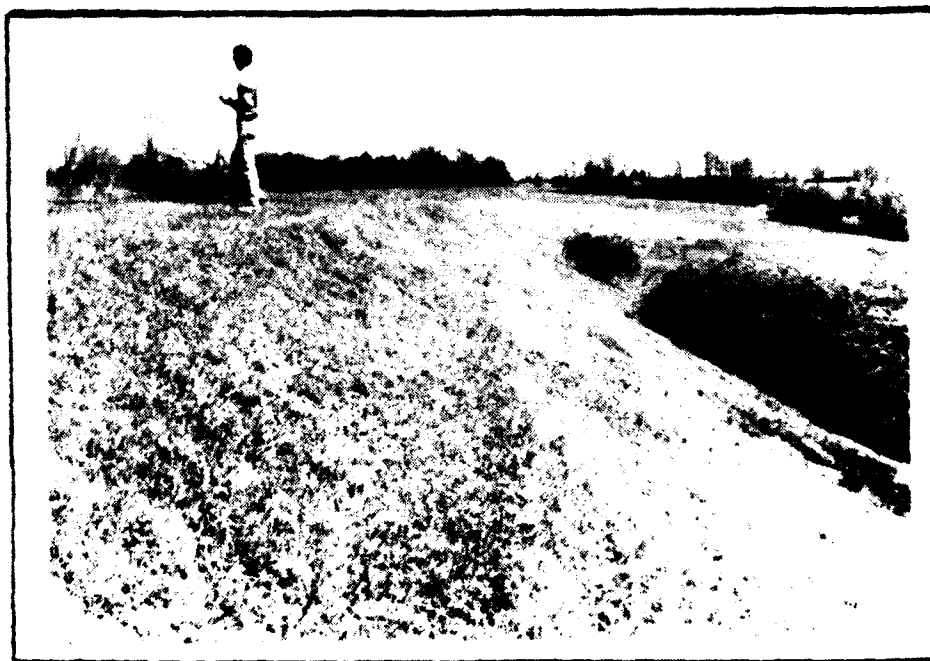


PHOTO NO.2



PHOTO NO. 3



PHOTO NO. 4



PHOTO NO.5



PHOTO NO.6



PHOTO NO. 7



PHOTO NO. 8



PHOTO NO. 9



PHOTO NO. 10



PHOTO NO. 11

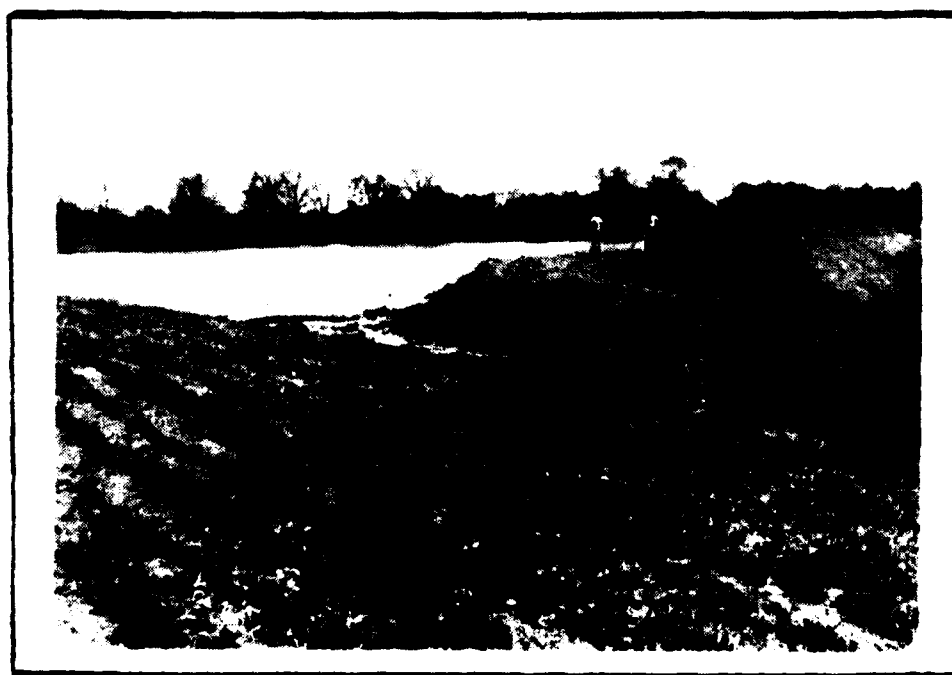


PHOTO NO. 12

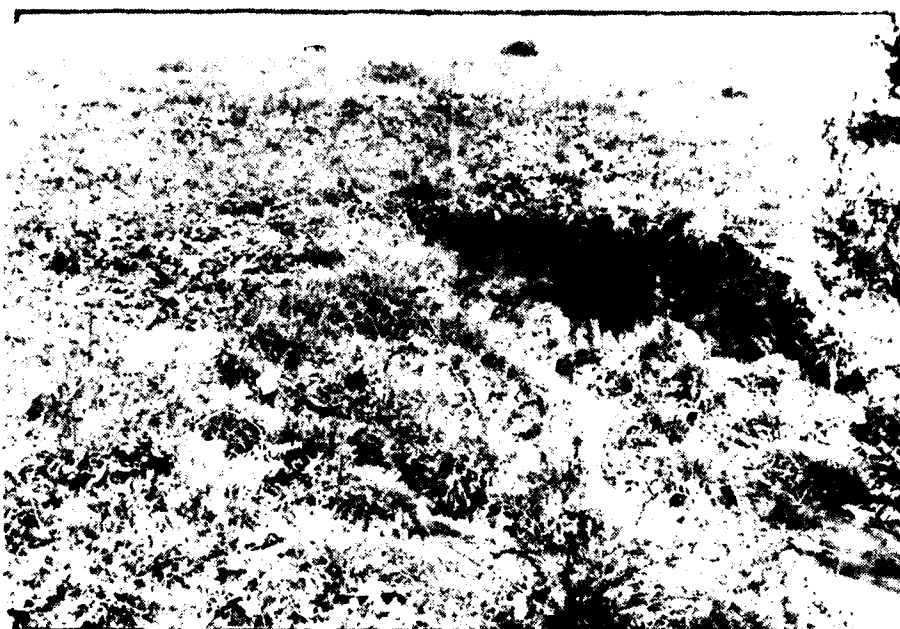


PHOTO NO. 13

APPENDIX D

TECHNICAL CRITIQUE
CHECKLISTS FOR VISUAL INSPECTION
ENGINEERING DATA
SOIL TESTS

Check List
Visual Inspection of Earth Dams
Department of Conservation
Division of Water Resources

Name of Dam Mary's Creek Lake Dam No. 8

County Shelby Date of Inspection March 11, 1981

ID # - State 79-7027 Federal TN 15727

Type of Dam Earth

Hazard Category-Federal 1 State High

Weather Sunny Temperature 70° F

Pool at Time of Inspection Normal Pool (distance from crest)
at top

Tailwater at Time of Inspection of pipe (distance from stream bed)

Design/As Built Drawings Available: Yes X No

Location: SCS - Nashville

Copy Obtained: Yes X No

Reviewed: Yes X No

Construction History Available: Yes No X

Location:

Copy Obtained: Yes No

Reviewed: Yes No

Other Records and Reports Available: Yes X No

Location: Watershed Work Plan - TDWR & SCS Regional Office, Nashville

Copy Obtained: Yes X No

Reviewed: Yes X No

Prior Incidents or Failures: Yes No X

Inspection Personnel and Affiliation:

Ed O'Neill - TDWR

George Moore - TDWR

William Culbert - TDWR

f. Embankment

A. Crest

Description (1st inspection) Relatively flat, rounded
upstream and downstream edges. Good Bermuda grass cover.

1. Longitudinal Alignment Straight over most of its
length. Curved near emergency spillway.

2. Longitudinal Surface Cracks None

3. Transverse Surface Cracks None

4. General Condition of Surface Good

5. Miscellaneous _____

B. Upstream Slope

1. Undesirable Growth or Debris None

2. Sloughing, Subsidence, or Depressions Appreciable
erosion. Rilling and gully formation over much
of length.

3. Slope Protection Bermuda grass only.

a. Condition of Riprap N/A

b. Durability of Individual Stones N/A

c. Adequacy of Slope Protection Against Waves
and Runoff Inadequate. Will need riprap
within next year or two.

d. Gradation of Slope Protection - Localized Areas
of Fine Material N/A

4. Surface Cracks None

C. Downstream Slope

1. Undesirable Growth or Debris Large bush and small
evergreen near middle toe of dam.

2. Sloughing, Subsidence, or Depressions; Abnormal
Bulges or Non-Uniformity Some scattered small depressions.
May be dispersive soil. Appear inactive.
3. Surface Cracks on Face of Slope None
4. Surface Cracks or Evidence of Heaving at
Embankment Toe None
5. Wet or Saturated Areas or Other Evidence of Seepage
on Face of Slope; Evidence of "Piping" or "Boils"
None
6. Drainage System 6" toe drain - submerged
7. Fill Contact with Outlet Structure Cannot be
ascertained because outlet is submerged
8. Condition of Grass Slope Protection Reasonably
full and uniform. Bermuda grass.

D. Abutments

1. Erosion of Contact of Embankment with Abutment from
Surface Water Runoff, Upstream or Downstream _____
Nothing significant

2. Springs or Indications of Seepage Along Contact of
Embankment with the Abutments None

3. Springs or Indications of Seepage in Areas a Short
Distance Downstream of Embankment - Abutment Tie-in
None

II. Area Downstream of Embankment, Including Channel

- A. Localized Subsidence, Depressions, Sinkholes, Etc. 100
square feet depressed area 100' left of the principal
spillway. Base of depression is moist. It tapers to a
shallow gully and extends D/S, intersecting the principal
spillway exit channel. 35' D/S of dam, depressed area breaks
into hole with standing water. No observable flow.
- B. Evidence of "Piping", "Boils", or "Seepage" _____
None besides that previously mentioned.
- C. Unusual Presence of Lush Growth, such as Swamp
Grass, etc. _____ None
- D. Unusual Muddy Water in Downstream Channel Relatively
muddy because there is no flow and cows drink there.
- E. Sloughing or Erosion _____ Some minor sloughing initiated
by cattle traffic.
- F. Surface Cracks or Evidence of Heaving Beyond
Embankment Toe _____ None
- G. Stability of Channel Sideslopes _____ Good. Relatively steep.
- H. Condition of Channel Slope Protection _____ Good. Natural
cover.

I. Adequacy of Slope Protection Against Waves, Currents,
and Surface Runoff Adequate

J. Miscellaneous Mud blocks stilling basin. Pipe and especially
embankment drains should not be submerged. Could cause build
up of methane gas in embankment.

K. Condition of Relief Wells, Drains, and Other
Appurtenances N/A

L. Unusual Increase or Decrease in Discharge from
Relief Wells N/A

III. Instrumentation

A. Monumentation/Surveys N/A

B. Observation Wells N/A

C. Weirs N/A

D. Piezometers N/A

E. Other _____

iv. Spillways

A. Service Spillway (Service/Emergency Combination Yes No X)

1. Intake Structure Condition Good (observed from dam). Timbers are noticeably weathered.
2. Outlet Structure Condition No structure - outlet submerged.
3. Pipe Condition Submerged in impact basin.
4. Evidence of Leakage or Piping None
5. General Remarks Pipe is apparently not laid according to specifications. Outlet is approximately 4 feet below design location.

B. Emergency Spillway

1. General Condition Good. Uniform and well grassed. Some noteable erosion along upstream left side slope.
2. Entrance Channel Some appreciable sloughing near water surface. Rest is uniform and well grassed. Fence across entrance channel.
3. Control Section Same as general condition. Best grass cover.

3. Exit Channel Same as general condition.

4. Vegetative/Woody Cover Grass only.

5. Other Observations _____

V. Emergency Drawdown Facilities (if part of service spillway
so state), Valve stem visable at riser. Doesn't work. Always
leaked so clay was dumped over inlet.

Are Facilities Operable: Yes No X

Were Facilities Operated During Inspection: Yes No X

Date Facilities Were Last Used Soon after dam was built

VI. Reservoir

A. Slopes Some erosion around entire reservoir.

B. Sedimentation Moderate to high.

C. Turbidity Low to moderate.

VII. Drainage Area

Description (for hydrologic analysis) Mostly
pasture and woodland.

A. Changes in Land Use None

VIII. Downstream Area (Stream)

A. Condition (obstructions, debris, etc.) 2 houses and
several farm buildings 4600 feet downstream.

B. Slopes 0.5% channel slope

C. Approximate No. Homes, Population, and Distance D/S

2 houses 4600 feet downstream.

D. Other Hazards Horse stables and track some distance
downstream.

IX. Miscellaneous

Incidents/Failures No incidents reported by owner.

Observed Geology of Area Loess soils (wind blown) covers most of area.

X. Conclusions

- 1) The dam is uniform and well grassed.
- 2) A few areas of significant erosion were observed on the upstream slope of the dam and downstream of the toe.
- 3) There was no measurable seepage found.

XI. Recommendations

- 1) Monitor depressions on downstream slope for development of flow.
- 2) Riprap upstream slope, particularly in area of extreme sloughing.
- 3) Develop an emergency action plan for alerting downstream residents in the event that failure appears imminent.

William B. Callahan
Regional Engineer

Chief Engineer

OHIO RIVER DIVISION, NASHVILLE DISTRICT

SOIL TEST DATA SUMMARY

PROJECT MARYS CREEK NO.8 HOLE 1 ELEV. TOP _____ SHEET 1 OF 1 SHEETS

[illegible]

Check List
Visual Inspection of Earth Dams
Department of Conservation
Division of Water Resources

Name of Dam Stotts (Tolly Murff)

County Shelby Date of Inspection April 1, 1981

ID # - State 79-7078 Federal TN 15776

Type of Dam Earth

Hazard Category-Federal 1 State High

Weather Sunny, breezy Temperature 70° F

Pool at Time of Inspection At Normal Pool
(spillway crest) (distance from crest)

Tailwater at Time of Inspection app 1/10 (distance from stream bed)

Design/As Built Drawings Available: Yes X No

Location: SCS Regional Office, Nashville and TDWR

Copy Obtained: Yes X No

Reviewed: Yes X No

Construction History Available: Yes No X

Location:

Copy Obtained: Yes No

Reviewed: Yes No

Other Records and Reports Available: Yes X No

Location: Watershed Work Plan - SCS Regional Office and TDWR

Copy Obtained: Yes X No

Reviewed: Yes X No

Prior Incidents or Failures: Yes No X

Inspection Personnel and Affiliation:

George Moore - TDWR

Bill Culbert - TDWR

Gene Davis - TDWR

David Roe - TDWR

I. Embankment

A. Crest

Description (1st inspection) Adequate grass cover.
Relatively flat and uniform. Sloughing from upstream
slope extends well into crest. Dam has new fill on
both ends. No grass cover or new embankment. Deep
animal burrows near mid-section. 2' deep gully/
depression begins approximately in middle of crest
extending 5-10' downstream. Some minor remnants of it
all the way to toe.

1. Longitudinal Alignment Straight
2. Longitudinal Surface Cracks New fill at left side of
dam has crack running its entire length. Apparently
the water has weakened the upstream slope to the
point that major sloughing would be inevitable with
any appreciable wave action.
3. Transverse Surface Cracks None
4. General Condition of Surface Poor
5. Miscellaneous

B. Upstream Slope

1. Undesirable Growth or Debris One small woody bush.

2. Sloughing, Subsidence, or Depressions Severe sloughing over entire length from water surface well into crest.

3. Slope Protection None. Some patches of grass where slope remains, but virtually all of the surface has sloughed off.

a. Condition of Riprap N/A

b. Durability of Individual Stones N/A

c. Adequacy of Slope Protection Against Waves and Runoff Poor

d. Gradation of Slope Protection - Localized Areas of Fine Material N/A

4. Surface Cracks New fill of left side of dam has surface crack near junction of upstream slope and crest. Runs onto upstream slope as it mates with old embankment material.

C. Downstream Slope

1. Undesirable Growth or Debris Only 1 tree, approximately 6" diameter, near toe right of center. Approximately 50 square yard area of woody bushes near center toe. Few others just downstream of right side of crest.

2. Sloughing, Subsidence, or Depressions; Abnormal

Bulges or Non-Uniformity No significant sloughing.
Pervasive minor nonuniformity from cattle traffic, but
no gullying has been set up and surface is extensively
grassed. Few small depressions along toe. One large
shallow one around tree, but looks to have been created
by cattle. No sign of seepage. (See crest)

3. Surface Cracks on Face of Slope _____

None

4. Surface Cracks or Evidence of Heaving at

Embankment Toe _____ None

5. Wet or Saturated Areas or Other Evidence of Seepage
on Face of Slope; Evidence of "Piping" or "Boils"

None

6. Drainage System _____ None apparent.

7. Fill Contact with Outlet Structure _____ N/A

8. Condition of Grass Slope Protection _____ Good

D. Abutments

1. Erosion of Contact of Embankment with Abutment from
Surface Water Runoff, Upstream or Downstream New
embankment construction at both ends of dam. No
significant erosion observed downstream along tie-ins.
Good grass cover.
2. Springs or Indications of Seepage Along Contact of
Embankment with the Abutments None
3. Springs or Indications of Seepage in Areas a Short
Distance Downstream of Embankment - Abutment Tie-in
None

II. Area Downstream of Embankment, Including Channel

A. Localized Subsidence, Depressions, Sinkholes, Etc. _____

None

B. Evidence of "Piping", "Boils", or "Seepage" None

C. Unusual Presence of Lush Growth, such as Swamp
Grass, etc. None

D. Unusual Muddy Water in Downstream Channel None

E. Sloughing or Erosion Nothing significant.

F. Surface Cracks or Evidence of Heaving Beyond
Embankment Toe None

G. Stability of Channel Sideslopes Good. Practically
flat cross-section.

H. Condition of Channel Slope Protection Excellent grass
cover except on the left side of dam near critical section
where embankment was refilled. No grass cover here.

I. Adequacy of Slope Protection Against Waves, Currents,
and Surface Runoff Good

J. Miscellaneous _____

K. Condition of Relief Wells, Drains, and Other
Appurtenances None

L. Unusual Increase or Decrease in Discharge from
Relief Wells N/A

III. Instrumentation

A. Monumentation/Surveys N/A

B. Observation Wells N/A

C. Weirs N/A

D. Piezometers N/A

E. Other _____

IV. Spillways

A. Service Spillway (Service/Emergency Combination Yes X No)

1. Intake Structure Condition See Emergency Spillway

2. Outlet Structure Condition _____

3. Pipe Condition _____

4. Evidence of Leakage or Piping _____

5. General Remarks _____

B. Emergency Spillway

1. General Condition Good. Well grassed and uniform
cross-section.

2. Entrance Channel Submerged, practically non-
existant. Control section occurs approximately
along dam centerline.

3. Control Section Same as general.

3. Exit Channel Same

4. Vegetative/Woody Cover Grass only. Adequate.

5. Other Observations Approximately 150 feet down-
stream the channel takes a 3 foot drop then widens
appreciably.

VI. Reservoir

A. Slopes Gradual

B. Sedimentation Assumed moderate to high

C. Turbidity High

VII. Drainage Area

Description (for hydrologic analysis) Predominantly
active pasture land.

A. Changes in Land Use None expected.

VIII. Downstream Area (Stream)

A. Condition (obstructions, debris, etc.) Nothing significant

B. Slopes 0.7% (immediately upstream of Mary's Creek Dam
No. 8 reservoir)

C. Approximate No. Homes, Population, and Distance D/S

2 homes and horse stables approximately 8100 feet

downstream.

D. Other Hazards _____

IX. Miscellaneous

Incidents/Failures None reported by owner.

Observed Geology of Area Predominantly Loess soil.

X. Conclusions

- 1) The dam is uniform and well grassed with some undesirable vegetation.
- 2) The upstream slope has undergone considerable sloughing extending well into the crest.
- 3) No signs of seepage were observed.

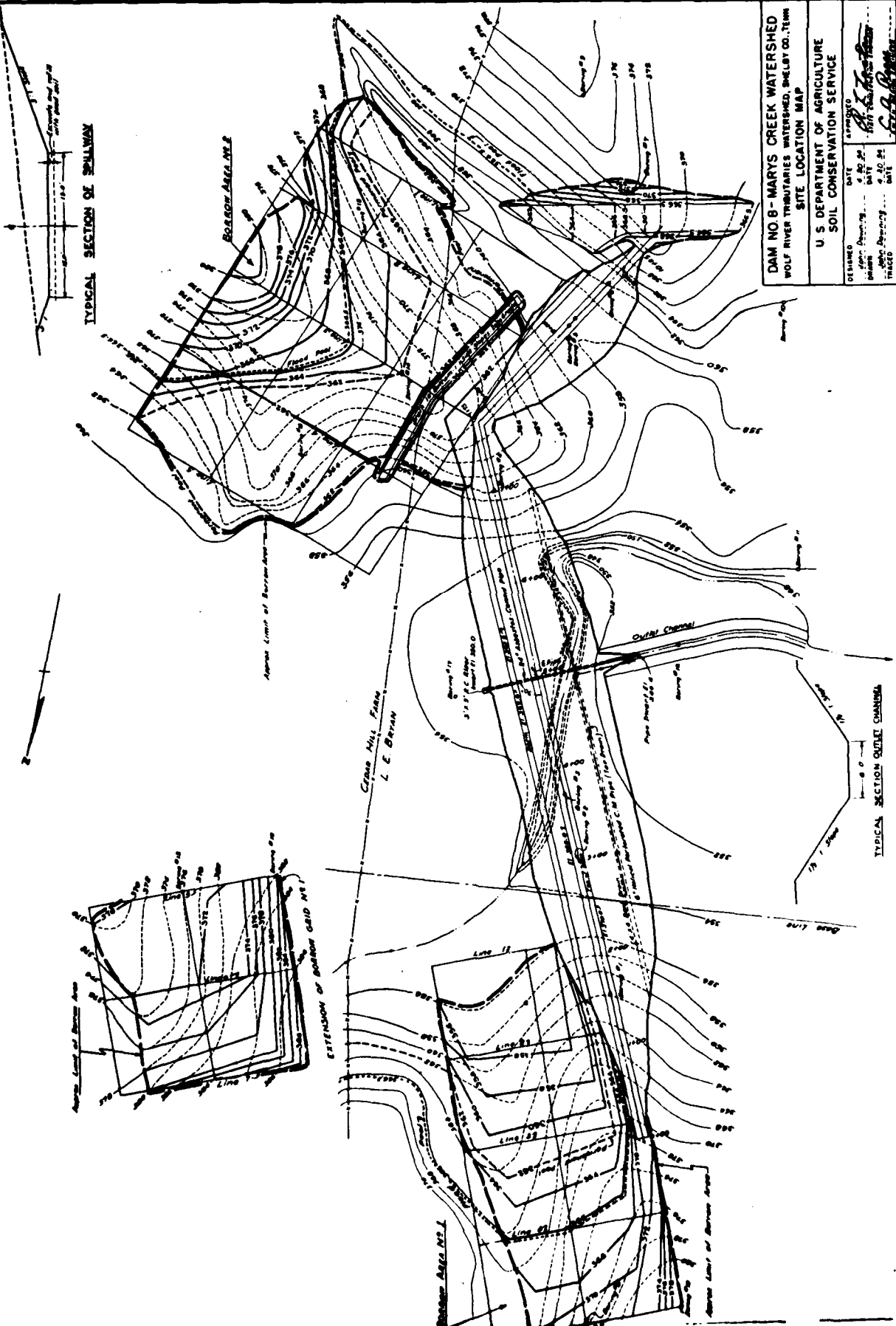
XI. Recommendations

- 1) Provide some protection for the upstream slope of the dam.
- 2) Remove the tree and bushes from the downstream slope.
- 3) Prevent cattle from walking on the dam.
- 4) Develop an emergency action plan for alerting downstream residents in the event that failure appears imminent.

William F. Calhoun
Regional Engineer

Chief Engineer

APPENDIX E
DESIGN DRAWINGS



DAM NO 8 - MARYS CREEK WATERSHED
WOLF RIVER TRIBUTARIES WATERSHED, SHELBY CO., TENN.
SITE LOCATION MAP

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

DESIGNED	DATE	APPROVED	DATE
W. H. P. ...	4. 20. 34	W. H. P. ...	4. 20. 34
CHECKED	DATE	W. H. P. ...	DATE
W. H. P. ...	4. 20. 34	W. H. P. ...	4. 20. 34
FIELD	DATE	W. H. P. ...	DATE
W. H. P. ...	4. 20. 34	W. H. P. ...	4. 20. 34
CONSTRUCTED	DATE	W. H. P. ...	DATE
W. H. P. ...	4. 20. 34	W. H. P. ...	4. 20. 34

SHEET 2 OF 10

STEEL SCHEDULE FOR THREE COLUMNS	WALPOLE	QUAN.	LENGTH	TOTAL VOLUME
LOCATION	1	2	3	4
1	8	10	0"	34
2	8	10	0"	34
3	8	10	0"	34
4	8	10	0"	34
5	8	10	0"	34
6	8	10	0"	34
7	8	10	0"	34
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89	8	10	0"	

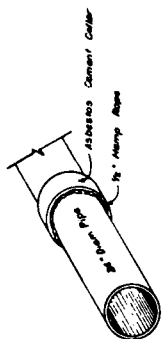
STEEL SCHEDULE FOR THREE COLUMNS				
LOCATION	WALPOLE	QUAN.	LENGTH	TOTAL VOLUME
1	8	10	0"	34
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97	8	10	0"	34
98	8	10	0"	34
99	8	10	0"	34
100	8	10	0"	34

QUANTITIES

VOLUME OF CONCRETE 1.45 CU YD
REINFORCING STEEL 2880 LBS
150000

VOLUME OF CONCRETE · 1.45 CU YDS
REINFORCING STEEL · 500.0 FT-3/16 IN

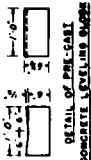
VOLUME OF CONCRETE · 1.45 CU YDS
REINFORCING STEEL · 500.0 FT-3/16 IN



DETAIL OF 1/2" HEMP ROPE TO BE TIED AROUND PIPE EACH SIDE OF COUPLINGS AT EVERY JOINT TO PREVENT CONCRETE SLEEPING UNDER COUPLINGS DURING POURING OPERATIONS.



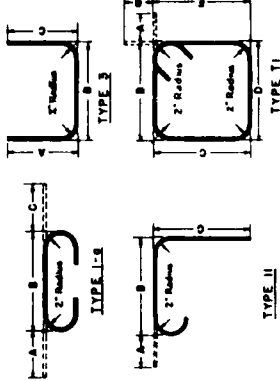
DETAIL OF SMALL ANNUAL GUARD
AT OUTLET END OF 6" C.M. PIPE



PRECAST CONCRETE LIFTING CLAMP

BAR TYPES

STRAIGHT



PIPE INSTALLATION DETAIL

BEDDING

STEEL SCHEDULE FOR COUNTERWEIGHT

QUANTITIES					
LOCATION	MARK	SIZE	QUAN.	LENGTH	TOTAL FEET
CONCRETE	C-1	4	4	4'-6"	5T 18'-0"
"	C-2	4	4	3'-0"	5T 12'-0"
VOLUME OF CONCRETE $\frac{GAL}{CU YD}$					
REINFORCING STEEL $\frac{LB}{LFT}$ $\frac{KILO}{METER}$					

QUANTITIES

VOLUME OF CONCRETE 0.90 CU YDS.
REINFORCING STEEL 0.0 L.FT. 22.00 LBS.

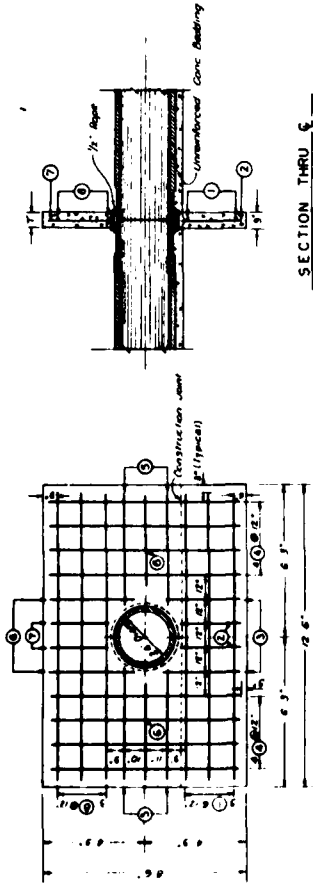
DAM NO. 8 - MARYS CREEK WATERSHED
WOLF RIVER TRIBUTARIES WATERWASH SHELBY CO., TENN.
DETAILS OF BENT, ANTI-SLEEP COLLAR, JOINT &
BEDDING, COUNTERWEIGHT & PIPE INSTALLATION

DECLARED	DATE	APPROVED
MADE	3-15-34	<i>J. P. Lester</i>
TRADED	4-8-34	<i>C. A. Burt</i>
DECLARED	4-8-34	<i>J. P. Lester</i>
DECLARED	4-10-34	<i>C. A. Burt</i>

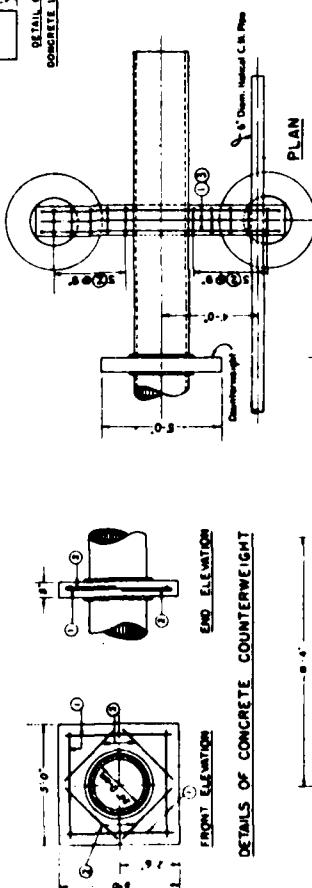
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

3455, Conservation Zone 118
C. A. Burt
J. P. Lester
DECLARED ON
2-P-87,000
SHEET 3 OF 10

DETAIL OF ANTI - SEEP COLLARS

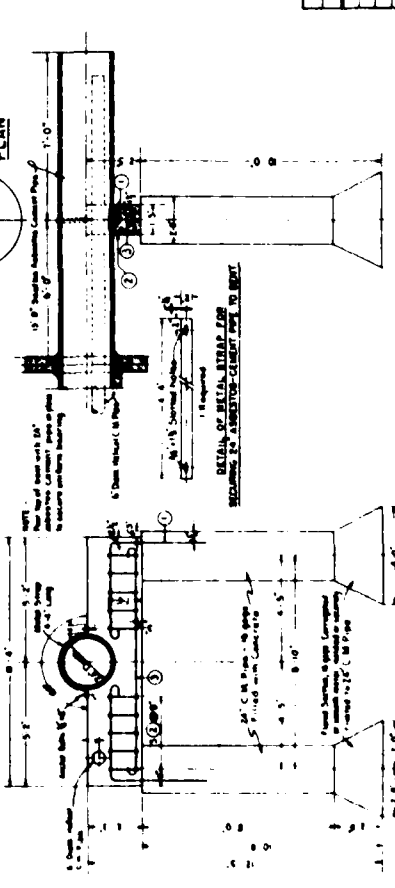


ELEVATION



END ELEVATION

DETAILS OF CONCRETE COUNTERWEIGHT



ELEVATION

DETAIL OF BENT AND PIPE OUTLET

STEEL SCHEDULE FOR BENT

LOCATION	MAINF. SIZE	SPALL ENTH.	TYPE	A	B	C	D	E	TOTAL
BENT	C-1	4	"	0	0	0	4	0	-
"	C-2	4	10	5	0	7	1	0	13
"	C-3	4	10	0	5	6	0	5	16
"	C-4	4	10	0	5	6	0	5	16
"	C-5	4	10	0	5	6	0	5	16
"	C-6	4	10	0	5	6	0	5	16
"	C-7	4	10	0	5	6	0	5	16
"	C-8	4	10	0	5	6	0	5	16
"	C-9	4	10	0	5	6	0	5	16
"	C-10	4	10	0	5	6	0	5	16
"	C-11	4	10	0	5	6	0	5	16
"	C-12	4	10	0	5	6	0	5	16
"	C-13	4	10	0	5	6	0	5	16
"	C-14	4	10	0	5	6	0	5	16
"	C-15	4	10	0	5	6	0	5	16
"	C-16	4	10	0	5	6	0	5	16
"	C-17	4	10	0	5	6	0	5	16
"	C-18	4	10	0	5	6	0	5	16
"	C-19	4	10	0	5	6	0	5	16
"	C-20	4	10	0	5	6	0	5	16
"	C-21	4	10	0	5	6	0	5	16
"	C-22	4	10	0	5	6	0	5	16
"	C-23	4	10	0	5	6	0	5	16
"	C-24	4	10	0	5	6	0	5	16
"	C-25	4	10	0	5	6	0	5	16
"	C-26	4	10	0	5	6	0	5	16
"	C-27	4	10	0	5	6	0	5	16
"	C-28	4	10	0	5	6	0	5	16
"	C-29	4	10	0	5	6	0	5	16
"	C-30	4	10	0	5	6	0	5	16
"	C-31	4	10	0	5	6	0	5	16
"	C-32	4	10	0	5	6	0	5	16
"	C-33	4	10	0	5	6	0	5	16
"	C-34	4	10	0	5	6	0	5	16
"	C-35	4	10	0	5	6	0	5	16
"	C-36	4	10	0	5	6	0	5	16
"	C-37	4	10	0	5	6	0	5	16
"	C-38	4	10	0	5	6	0	5	16
"	C-39	4	10	0	5	6	0	5	16
"	C-40	4	10	0	5	6	0	5	16
"	C-41	4	10	0	5	6	0	5	16
"	C-42	4	10	0	5	6	0	5	16
"	C-43	4	10	0	5	6	0	5	16
"	C-44	4	10	0	5	6	0	5	16
"	C-45	4	10	0	5	6	0	5	16
"	C-46	4	10	0	5	6	0	5	16
"	C-47	4	10	0	5	6	0	5	16
"	C-48	4	10	0	5	6	0	5	16
"	C-49	4	10	0	5	6	0	5	16
"	C-50	4	10	0	5	6	0	5	16
"	C-51	4	10	0	5	6	0	5	16
"	C-52	4	10	0	5	6	0	5	16
"	C-53	4	10	0	5	6	0	5	16
"	C-54	4	10	0	5	6	0	5	16
"	C-55	4	10	0	5	6	0	5	16
"	C-56	4	10	0	5	6	0	5	16
"	C-57	4	10	0	5	6	0	5	16
"	C-58	4	10	0	5	6	0	5	16
"	C-59	4	10	0	5	6	0	5	16
"	C-60	4	10	0	5	6	0	5	16
"	C-61	4	10	0	5	6	0	5	16
"	C-62	4	10	0	5	6	0	5	16
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"	C-67	4	10	0	5	6	0	5	16
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"	C-69	4	10	0	5	6	0	5	16
"	C-70	4	10	0	5	6	0	5	16
"	C-71	4	10	0	5	6	0	5	16
"	C-72	4	10	0	5	6	0	5	16
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"	C-74	4	10	0	5	6	0	5	16
"	C-75	4	10	0	5	6	0	5	16
"	C-76	4	10	0	5	6	0	5	16
"	C-77	4	10	0	5	6	0	5	16
"	C-78	4	10	0	5	6	0	5	16
"	C-79	4	10	0	5	6	0	5	16
"	C-80	4	10	0	5	6	0	5	16
"	C-81	4	10	0	5	6	0	5	16
"	C-82	4	10	0	5	6	0	5	16
"	C-83	4	10	0	5	6	0	5	16
"	C-84	4	10	0	5	6	0	5	16
"	C-85	4	10	0	5	6	0	5	16
"	C-86	4	10	0	5	6	0	5	16
"	C-87	4	10	0	5	6	0	5	16
"	C-88	4	10	0	5	6	0	5	16
"	C-89	4	10	0	5	6	0	5	16
"	C-90	4	10	0	5	6	0	5	16
"	C-91	4	10	0	5	6	0	5	16
"	C-92	4	10	0	5	6	0	5	16
"	C-93	4	10	0	5	6	0	5	16
"	C-94	4	10	0	5	6	0	5	16
"	C-95	4	10	0	5	6	0	5	16
"	C-96	4	10	0	5	6	0	5	16
"	C-97	4	10	0	5	6	0	5	16
"	C-98	4	10	0	5	6	0	5	16
"	C-99	4	10	0	5	6	0	5	16
"	C-100	4	10	0	5	6	0	5	16

QUANTITIES

VOLUME OF CONCRETE 4.0 CU YDS
REINFORCING STEEL 132.3 Lb 31.8 LBS

QUANTITIES	UNIT	PRICE	AMOUNT
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9
10	10	10	10
11	11	11	11
12	12	12	12
13	13	13	13
14	14	14	14
15	15	15	15
16	16	16	16
17	17	17	17
18	18	18	18
19	19	19	19
20	20	20	20
21	21	21	21
22	22	22	22
23	23	23	23
24	24	24	24
25	25	25	25
26	26	26	26
27	27	27	27
28	28	28	28
29	29	29	29
30	30	30	30
31	31	31	31
32	32	32	32
33	33	33	33
34	34	34	34
35	35	35	35
36	36	36	36
37	37	37	37
38	38	38	38
39	39	39	39
40	40	40	40
41	41	41	41
42	42	42	42
43	43	43	43
44	44	44	44
45	45	45	45
46	46	46	46
47	47	47	47
48	48	48	48
49	49	49	49
50	50	50	50
51	51	51	51
52	52	52	52
53	53	53	53
54	54	54	54
55	55	55	55
56	56	56	56
57	57	57	57
58	58	58	58
59	59	59	59
60	60	60	60
61	61	61	61
62	62	62	62
63	63	63	63
64	64	64	64
65	65	65	65
66	66	66	66
67	67	67	67
68	68	68	68
69	69	69	69
70	70	70	70
71	71	71	71
72	72	72	72
73	73	73	73
74	74	74	74
75	75	75	75
76	76	76	76
77	77	77	77
78	78	78	78
79	79	79	79
80	80	80	80
81	81	81	81
82	82	82	82
83	83	83	83
84	84	84	84
85	85	85	85
86	86	86	86
87	87	87	87
88	88	88	88
89	89	89	89
90	90	90	90
91	91	91	91
92	92	92	92
93	93	93	93
94	94	94	94
95	95	95	95
96	96	96	96
97	97	97	97
98	98	98	98
99	99	99	99
100	100	100	100

VOLUME OF CONCRETE 4.0 CU YDS
REINFORCING STEEL 122.4 LBS

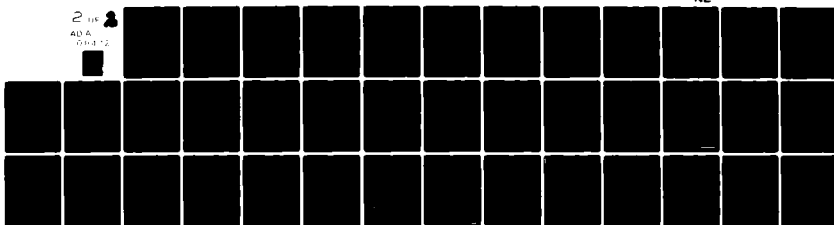
AD-A108 472

TENNESSEE STATE DEPT OF CONSERVATION NASHVILLE DIV 0--ETC F/G 13/13
NATIONAL PROGRAM OF INSPECTION OF NON-FEDERAL DAMS, TENNESSEE. --ETC(U)
SEP 81 W CULBERT DACW62-81-C-0056

UNCLASSIFIED

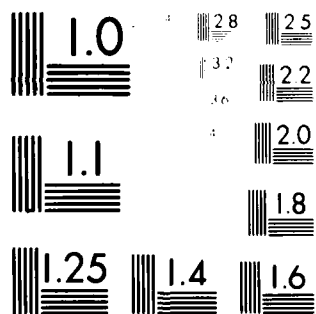
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DATE
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MICRO COPY REPRODUCTION TEST CHART
National Bureau of Standards

APPENDIX F
HYDRAULIC AND HYDROLOGIC DATA

HYDRAULIC AND HYDROLOGIC ANALYSIS

According to OCE guidelines, Mary's Creek Dam No. 8 must be able to safely pass a minimum of the one-half Probable Maximum Flood ($\frac{1}{2}$ PMF). Six hour rainfall depths for the Probable Maximum Precipitation and the 100 year rainfall were obtained from the U. S. Weather Service's Technical Paper 40. Flood routings were performed using the HEC-1-CB computer program. The program uses the dimensionless hydrograph technique described in Section 4 of the Soil Conservation Service National Engineering Handbook and the modified puls method of reservoir routing.

The peak outflow from the $\frac{1}{2}$ PMF (AMC II) is 449 cfs. This flood overtops the dam by 0.2 feet for 1.8 hours.

Mary's Creek No. 8

SUMMARY OF ROUTINGS

EVENT	ANTECEDENT MOISTURE CONDITION	
	II	III
PMF	Overtops the dam 1.2' maximum for 3.2 hours	Overtops the dam 1.5' maximum for 3.3 hours
$\frac{1}{2}$ PMF	Overtops the dam 0.2' maximum for 1.8 hours	Overtops the dam 0.5' maximum for 2.2 hours
100 - YEAR	Maintains 5.5' of freeboard	Maintains 4.7' of freeboard

The spillways are inadequate to pass the $\frac{1}{2}$ PMF by:

136 cfs (AMC II)
424 cfs (AMC III)

MARY'S CREEK DAM #8

CURVE # AND LAG TIME DETERMINATION :

PMP = 29.7"

		CN	
		<u>B</u>	<u>C</u>
LAND USE:	PASTURE - 50%	62	75
(% OF D.A.)	WOODLD. - 35%	60	73
	RESIDENTIAL - 3%	75	82
	WATER - 12%	100	

AVER. GROUND SLOPE: $\approx 5.6\%$

HYDROLOGIC SOIL GP.

SOIL TYPES:	MEMPHIS - 64%	B
	LOUIS - 22%	B
	GRENADA - 14%	C

$$\begin{aligned}
 CN &= 0.50 [0.86(62) + 0.14(75)] + \\
 &0.35 [0.86(60) + 0.14(73)] + \\
 &0.03 [0.86(75) + 0.14(82)] + \\
 &0.12(100)
 \end{aligned}$$

$$= 68 \text{ (AMC II)}$$

$$84 \text{ (AMC III)}$$

LONGEST WATER COURSE (L) = 2600'

$$\text{LAG} = \frac{L^{0.8} (S+1)^{0.7}}{1900 \gamma^{0.5}}$$

$$= 0.41 \text{ hrs. (AMC II)}$$

$$= 0.25 \text{ hrs. (AMC III)}$$

MARYS CREEK DAM #8

SPILLWAY RATING

PRINCIPAL SPILLWAY FLOW

$$D = 24''$$

$$L = 163'$$

$$K_e = 0.8 \text{ (H.D. BK OF CONC. + CULV. PIPE)}$$

HYDRAULICS - DROP INLETS +

SAG CULVERTS P. 178)

$$K_b = 0$$

$$n = 0.012$$

$$K_p = \frac{5077 n^2}{D^{4/3}}$$

$$= \frac{5077 (0.012)^2}{24^{4/3}}$$

$$= 0.016$$

$$Q_p = A \sqrt{\frac{2gH}{1 + K_e + K_b + K_p L}}$$

$$= 3.14 \sqrt{\frac{64.4}{1 + 0.8 + 0 + 0.016(163)}} \sqrt{H}$$

$$Q_p = 13.42 \sqrt{H}$$

LK. EL.	H	Q _p	Q _{weir}
363	0	0	0
364	2	43	46
365	14	50	129
368	16.7	55	
T.O. 369.6	18.6	58	
372	21	61	

* Q_i = PIPE FLOW

Q_{weir} = WEIR FLOW

$$= CL H^{3/2}$$

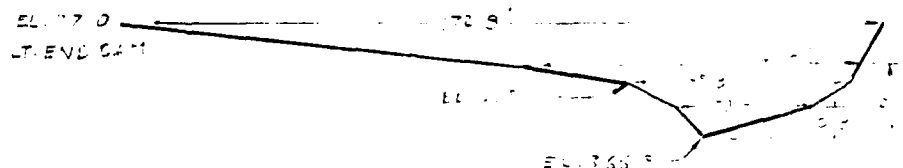
$$= 3.5 (13) H^{3/2}$$

$$= 45.5 H^{3/2}$$

EMERGENCY SPILL FLOW

$$\frac{Q^2}{g} = \frac{A^3}{T} \text{ FLOW & CREST DEPTH}$$

LK. EL.	EL. OF CREST	T	A	Q	EL.
363.0	363.0	0	0	0	
367.0	367.0	10.4	10.4	43.0	367.0
370.0	370.0	47.3	47.3	129.0	370.0
372.0	372.0	71.5	71.5	180.0	372.0
374.0	374.0	91.9	91.9	220.0	374.0

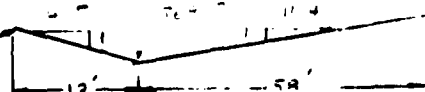


NOTE: SL OF LOW WATER NOT TO BE
CAME TO BE LOW WATER
BECAUSE THE CREST IS
40' D/S OF THE DAM & THE
FLOOD FLOW NOT TO BE
TAKEN INTO ACCOUNT
(1.5:1.5).

FOR THE WALL CHARTS & THE
OF THE DAM FOR 45' 150'

LK. EL.	EL. OF CREST	T	A	Q	EL.
363.0	363.0	0	0	0	363.0
364.0	364.0	7.5	7.5	29.0	364.0
370.0	370.0	47.3	47.3	129.0	370.0
372.0	372.0	71.5	71.5	180.0	372.0
374.0	374.0	91.9	91.9	220.0	374.0

STAT. 1406.8
EL. 371.4



380

375

370

LK EL.
(MSL)

365

360

355

350

345 0

MARYS CREEK #8
LAKE EL. VS. STORAGE

1000

900

800

700

600

500

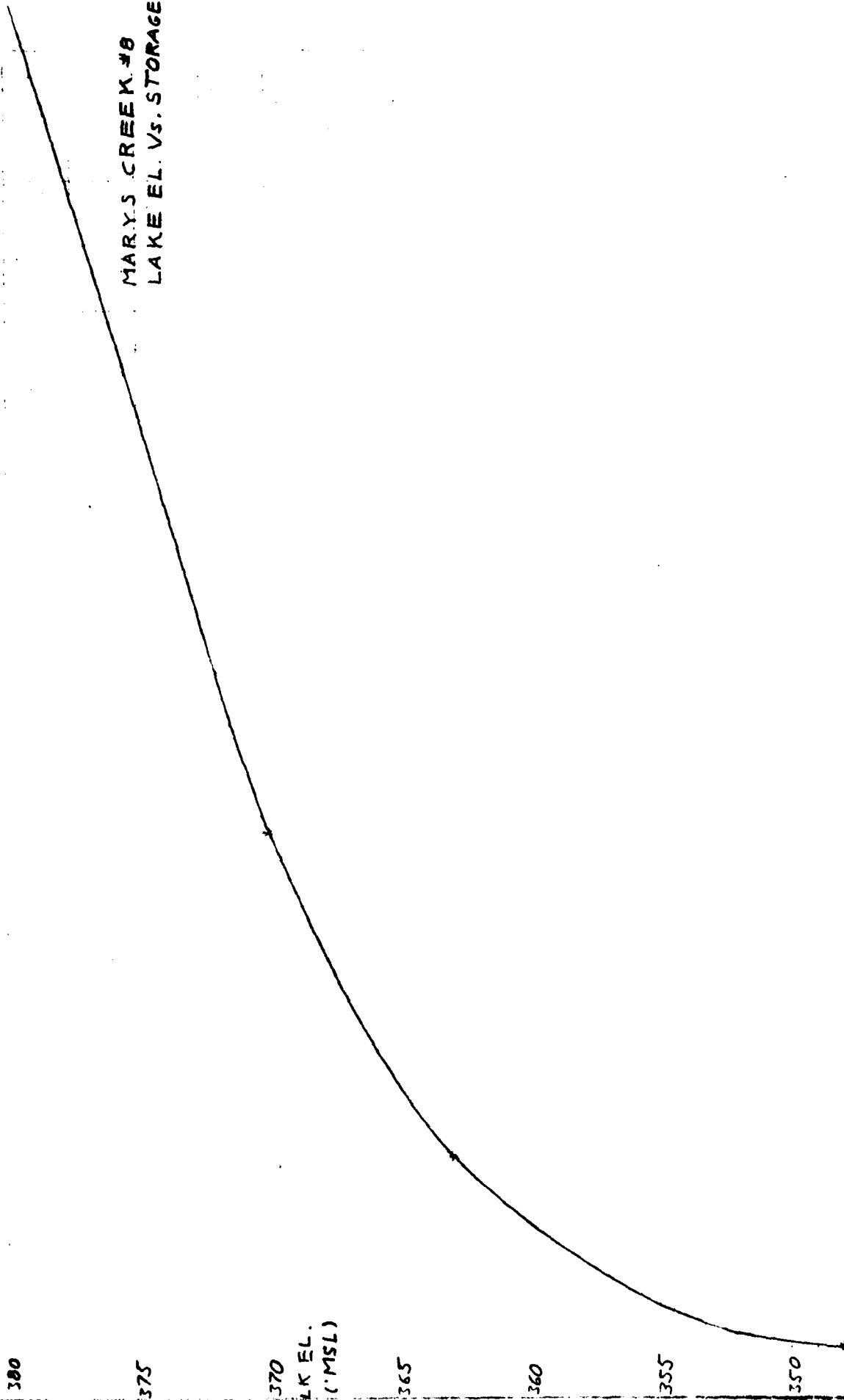
400

300

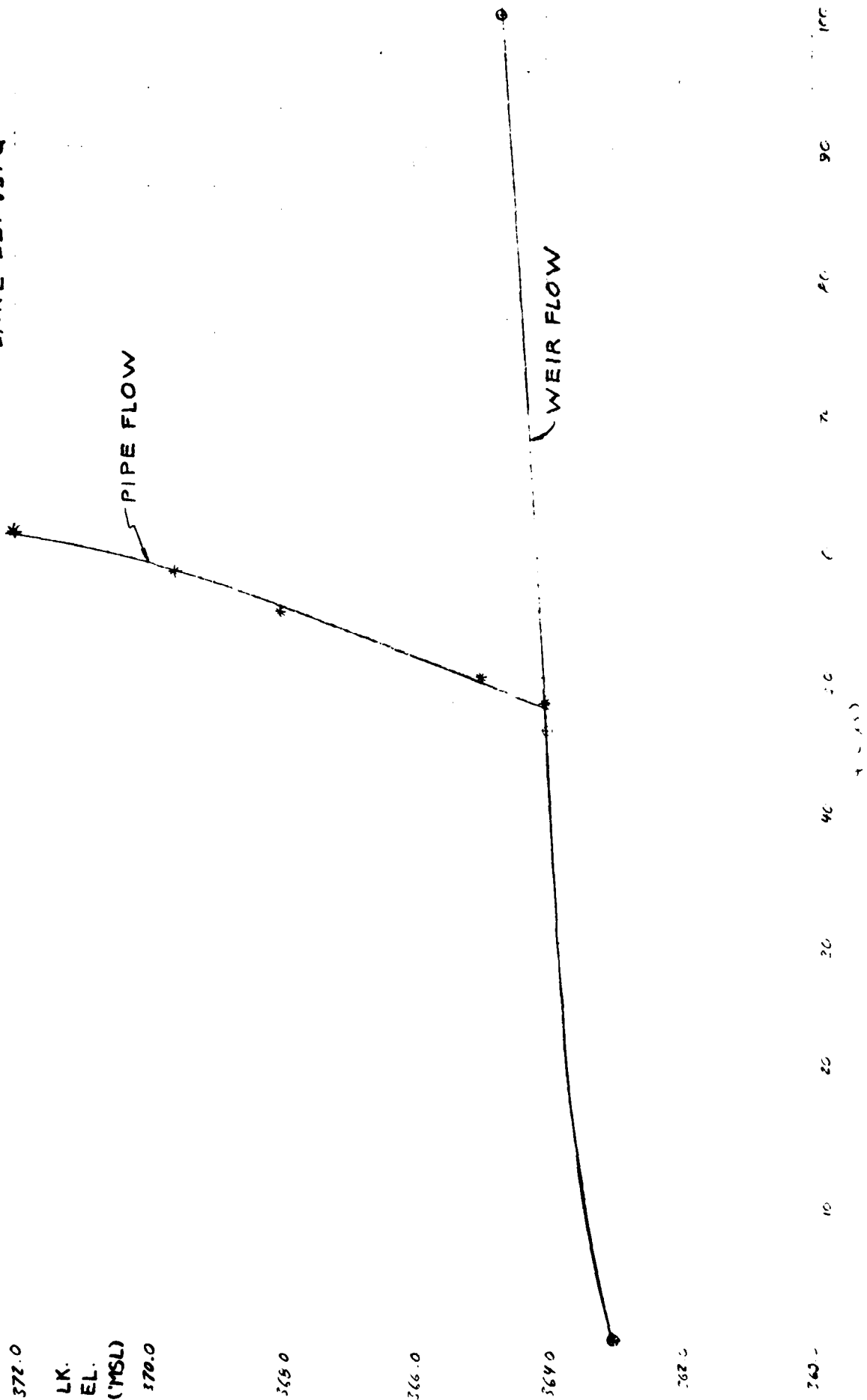
200

100

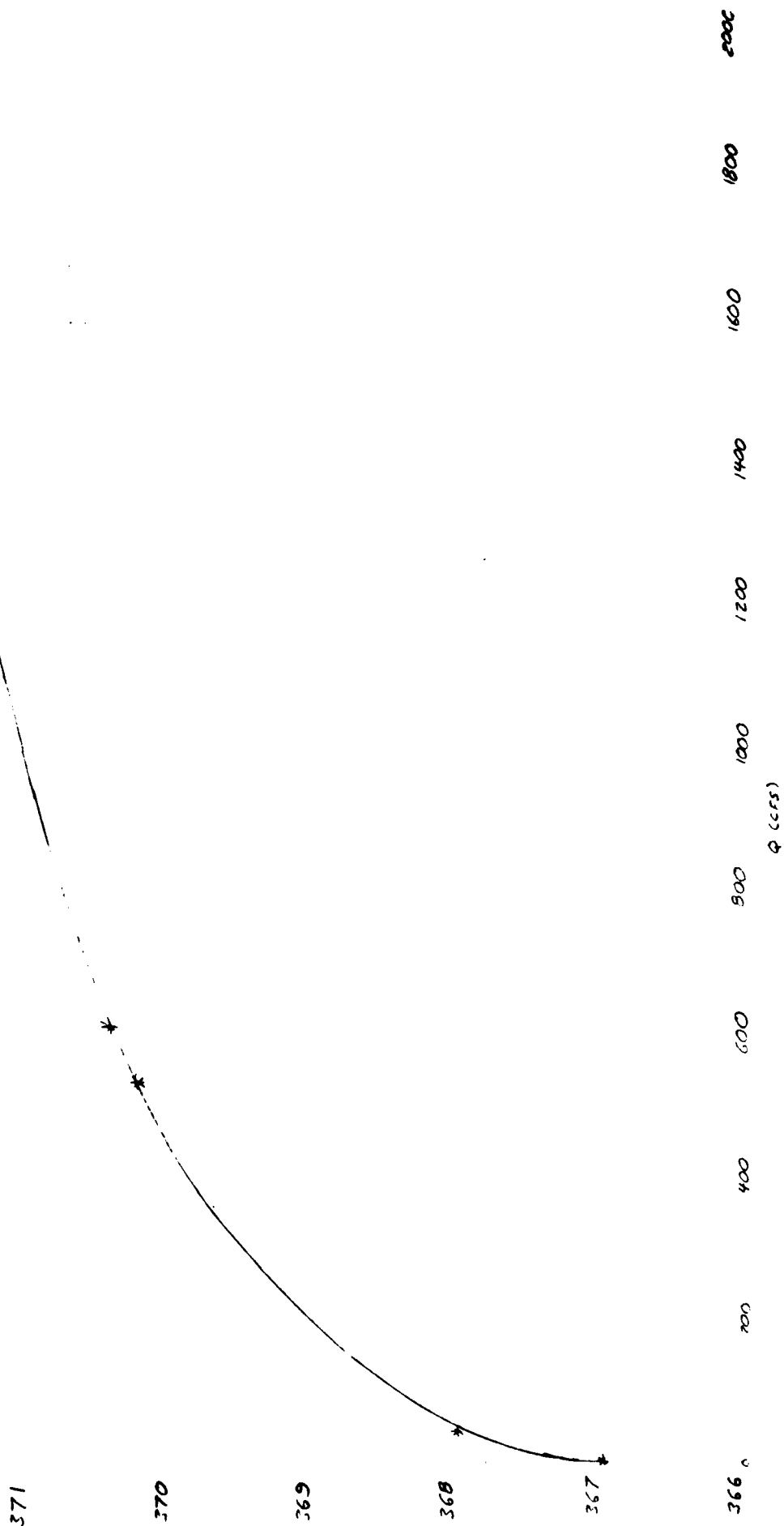
STORAGE (AC-FT)



MARYS CREEK #8
 PRINCIPAL SPILLWAY
 RATING
 LAKE EL. VS. Q



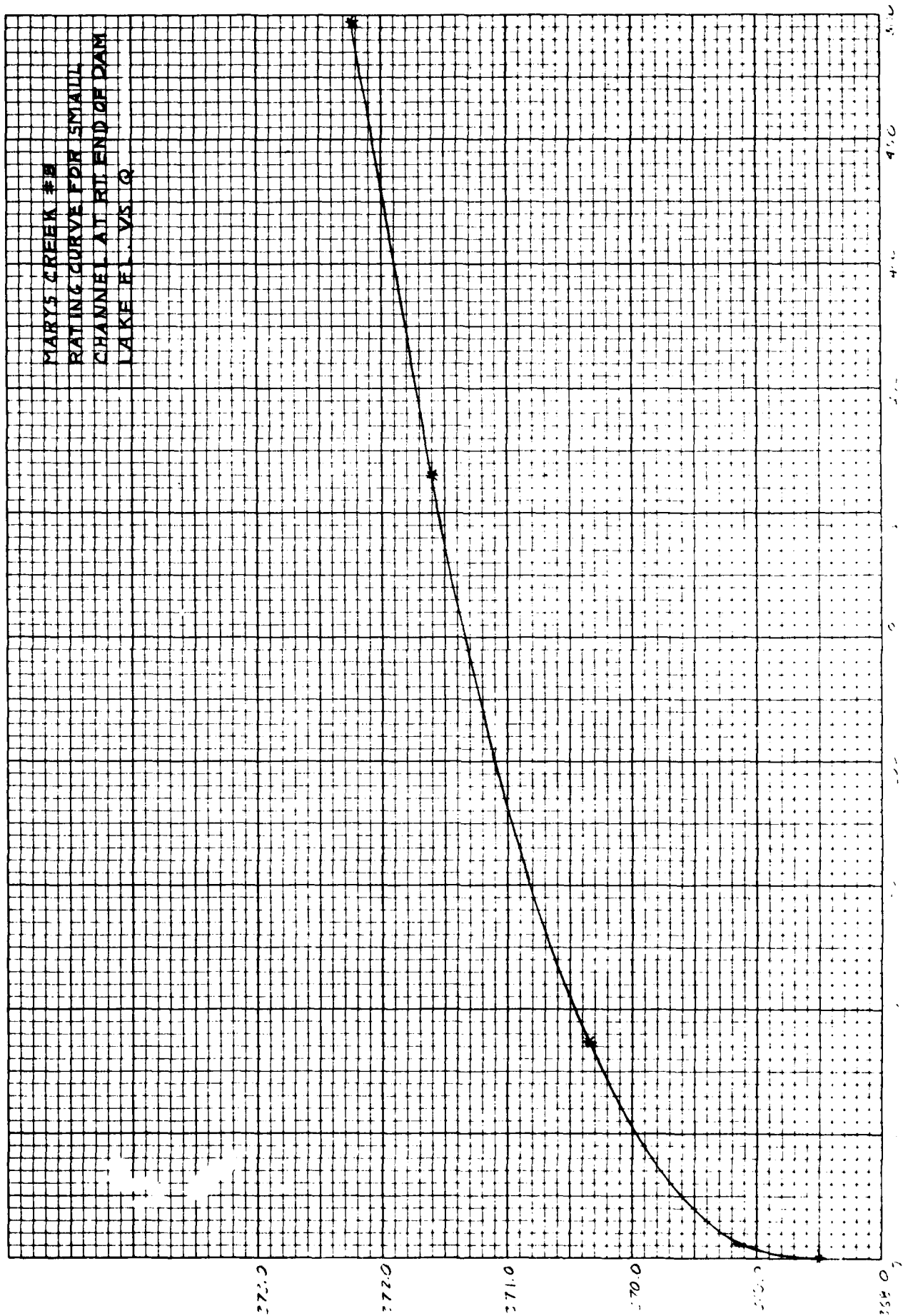
MARYS CK. #8
 EMER. SPILLWAY RATING
 LAKE EL. Vs. Q



10 X 10 PER INCH

MADE IN U.S.A.

MARYS CREEK #1
RATING CURVE FOR SMALL
CHANNEL AT RT. END OF DAM
LAKE FL. VS Q



372

370

368

LK. EL.
(MSL)

366

364

362

360

MARYS CREEK #8
COMPOSITE SPILLWAY
RATING
LK. EL. Vs. Q

LK. EL.	Q
363	0
364.0	48
366.9	53
367.9	99
370.3	760
371.8	2301

2000

1800

1600

1400

1200

1000

900

800

400

200

Q (CFS)

PROGRAM PROCEDURE

<u>Input Sequence</u>	<u>Page</u>	
I	1	a) Routing inflow hydrograph through Stotts Lake Dam (Tolly Murff). b) Routing breach hydrograph from Stotts through reach between Stotts Dam and Mary's Creek Reservoir. c) Combining inflow hydrograph to Mary's Creek No. 8 and breach hydrograph from Stotts. d) Routing composite inflow through Mary's Creek Dam.
II	9	Same sequence as above for AMC III condition.
III	11	Standard inflow hydrograph routing through Mary's Creek Dam assuming Stotts Lake does not exist. ¹
IV	13	Same procedure as above for AMC III condition.

¹This is a reasonable approximation if Stotts Dam does not breach. It is a conservative approach from a design standpoint (i.e., it gives higher flow values) because spillway outflow will not exceed the inflow that is assumed if the dam is absent, until the dam overtops.

[illegible]

DE (HEC-1)
 DAM SAFETY VERSION JULY 1978
 LAST MODIFICATION 01 APR 80

RUN DATE 81/06/09.
 TIME 06.59.05.

MARYS CREEK AND TOLLY MURFF DAMS
 SHELBY CO.
 AWC II

NO	MNR	MIN	IDAY	JOB SPECIFICATION				IPRT	NSTAN
:00	0	6	0	IHR	ININ	METRC	IPLT	0	
			JOPER	NUT	LROPT	TRACE		4	
			5	0	0	0		0	

MULTI-PLAN ANALYSES TO BE PERFORMED
 MPLAN- 1 MPTIO- 3 LRTIO- 1
 RTIOS- .09 .50 1.00

SUB-AREA RUNOFF COMPUTATION

INFLOW HYDROGRAPH COMPUTATIONS FOR TOLLY MURFF

1HYDG	1UNG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOU	ISAME	LOCAL
1	2	.06	0.00	.06	1.00	0.000	0	1	0
HYDROGRAPH DATA									
IATAQ		ICOMP	IECON	ITAPE	JPLT	JFRT	INAME	ISTAGE	IAUTO
1		0	0	0	1	0	1	0	0
PRECIP DATA									
SFE		PMS	R6	R12	R24	R48	R72	R96	
0.00		29.70	100.00	101.00	102.00	0.00	0.00	0.00	
LOSS DATA									
LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRSK	RTIOK	STRTL	CNSTL	ALSTX
0	0.00	0.00	1.00	0.00	0.00	1.00	-1.00	-71.00	0.00
									RTIMP
									0.00

HYDROGRAPH ROUTING

ROUTING FLOW THROUGH TOLLY MURFF

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRY	INAME	ISTAGE	IAUTO
2	1	0	0	1	0	1	0	0
ROUTING DATA								
CLOSS	AUG	INES	ISAME	IOPT	IMPP	LSTR		
0.0	0.00	1	1	0	0	0		
NSTPS NSTDL								
1	0	LAG	AMSK	X	TSK	STORA	ISPRAT	
		0	0.000	0.000	0.000	-387.	-1	

STAGE	387.00	387.80	388.00	390.00	391.00
FLOW	0.00	25.00	173.00	567.00	1124.00
CAPACITY	0.	40.	64.	206.	
ELEVATION	372.	387.	390.	400.	

CREL	SPUID	COOL	EXPU	ELEV	COOL	CAREA	EXPL
387.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

DAM DATA			
TOREL	COOD	EXPD	DAMUID
388.9	3.1	1.5	422.

CREST LENGTH	0.	150.	360.
AT OR BELOW			
ELEVATION	388.9	390.6	390.9

DAM BREACH DATA			
BRUID	Z	ELBH	TFAIL
19.	1.00	371.90	.50
			USEL
			387.00
			388.90

PEAK OUTFLOW IS 16. AT TIME 16.60 HOURS

BEGIN DAM FAILURE AT 15.90 HOURS

PEAK OUTFLOW IS 1856. AT TIME 16.24 HOURS

BEGIN DAM FAILURE AT 15.50 HOURS

PEAK OUTFLOW IS 2862. AT TIME 15.

E>

XXXXXXXXXXXX

XXXXXXXXXXXX

XXXXXXXXXXXX

XXXXXXXXXX

XXXXXXXXXXXX

HYDROGRAPH ROUTING

ROUTING OF BREACH HYDROGRAPH THROUGH REACH BETWEEN RESERVOIRS

ISTAG	3	ICOMP	1	IECON	0	ITAPE	0	JPLT	1	JPRT	0	ISTAGE	0	AUTO	0
CLOSS	0.0	AUG	0.00	INES	1	ROUTING DATA	0	IOPT	0	IPRP	0	LSTR	0		
NSTPS	1	NSTDL	0	LAG	0	ANSCK	0.000	X	0.000	TSK	0.000	STORA	0	ISPRNT	0

NORMAL DEPTH CHANNEL ROUTING

ON(1)	ON(2)	ON(3)	ELNUT	ELMAX	RLNTH	SEL
.0250	.0250	.0250	363.0	380.0	870.	.01020

CROSS SECTION	COORDINATES	ES-	STA,	ELEV,	STA,	ELEV-	ETC
0.00	385.00	188.00	374.00	215.00	363.00		
507.00	374.00	564.00	380.00	628.00	385.00		

	0.00	3.36	7.04	11.04	15.35	19.99	24.95	30.23	35.82
STORAGE 41.74	47.98	54.53	61.41	68.60	76.11	83.92	92.04	100.47	109.20
118.25									
OUTFLOW 43012.27	0.00	916.64	2980.23	5998.73	9921.35	14733.30	20435.87	27039.12	34558.38
195120.70	52421.67	62808.95	74197.51	87613.94	102558.69	118656.97	135936.91	154424.41	174144.29
STAGE 371.05	363.00	363.89	364.79	365.68	366.58	367.47	368.37	369.26	370.16
380.00	371.95	372.84	373.74	374.63	375.53	376.42	377.32	378.21	379.11
FLOW 43012.27	0.00	916.64	2980.23	5998.73	9921.35	14733.30	20435.87	27039.12	34558.38
195120	52421.67	62808.95	74197.51	87613.94	102558.69	118656.97	135936.91	154424.41	174144.29

SPFE PMS RS R12 R24 R48 R72 R96
 0.00 20.70 100.00 101.00 100.00 0.00 0.00 0.00
 LROPT STRKR DLTGR RTIOL ERAIN STRKS RTIOX STRTL CWSL ALSMX RTIMP
 0 0.00 0.00 1.00 0.00 0.00 1.00 -1.00 -00.00 0.00 0.00
 CURVE NO - 68.00 LETNESS - -1.00 EFFECT CN - 68.00
 UNIT HYDROGRAPH DATA
 TC- 0.00 LAG- .41
 RECESSION DATA
 STRTQ- 0.00 QRCN- 1.00 RTIOR- 1.50
 END-OF-PERIOD FLOW
 MO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q MO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q
 30.29 25.30 5.00 62452.
 (769.) (643.) (127.) (1768.44)

COMBINE HYDROGRAPHS

HYDROGRAPHS COMBINED AT THIS PT.

ISTAG ICOMP IECON ITAPE JPLT JPRF INAME ISTAGE IAUTO
 5 2 0 0 0 0 0 1 0 0

HYDROGRAPH ROUTING

ROUTING THROUGH MARYS CREEK

ISTAG ICOMP IECON ITAPE JPLT JPRF INAME ISTAGE IAUTO
 6 1 0 0 0 0 0 1 0 0
 ROUTING DATA
 CLOSS AUG INES ISARE IOPT IMPP LSTR
 0.0 0.000 0.00 1 1 0 0 0
 NSTPS NSTDL LAG AMSKX X TSK STORA ISPRAT
 1 0 0 0.000 0.000 -1

CREST LENGTH
 AT OR BELOW
 ELEVATION
 0. 550. 1000. 1120.
 369.6 370.0 370.5 371.0
 PEAK OUTFLOW IS 48. AT TIME 18.50 HOURS
 PEAK OUTFLOW IS 585. AT TIME 17.30 HOURS
 PEAK OUTFLOW IS 3708. AT TIME 16.20 HOURS

1

XXXXXXXXXX

XXXXXXXXXX

XXXXXXXXXX

XXXXXXXXXX

XXXXXXXXXX

PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
 FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
 AREA IN SQUARE MILES (SQUARE KILOMETERS)

OPERATION STATION AREA PLAN RATIO 1 RATIO 2 RATIO 3
 .09 .50 1.00

HYDROGRAPH AT 1 (.06 1 71. 380. 761.
 (.17) (2.00) (10.77) (21.55) (2573.
 ROUTED TO 2 (.06 1 16. 1670. 2573.
 (.17) (.46) (47.29) (72.87) (2461.
 ROUTED TO 3 (.06 1 16. 1726. 2461.
 (.17) (.46) (48.87) (69.68) (3326.
 HYDROGRAPH AT 4 (.38 1 309. 1653. 3326.
 (.59) (8.76) (47.09) (94.19) (5767.
 2 COMBINED 5 (.45 1 324. 2803. 5767.
 (1.16) (9.18) (79.37) (163.31) (3708.
 ROUTED TO 6 (.45 1 48. 585. 3708.
 (1.16) (1.37) (16.56) (104.99) (

SUMMARY OF DAM SAFETY ANALYSIS

1

PLAN 1 INITIAL VALUE SPILLWAY CREST TOP OF DAM

E>

..... 1337

1.50	1726.	364.2	16.30
1.00	2451.	364.6	15.90
SUMMARY OF DAM SAFETY ANALYSIS			

.....	ELEVATION STORAGE OUTFLOW	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM			
		363.00	363.00	369.00			
		149.	149.	362.			
		0.	0.	449.			
RATIO OF PMF	MAXIMUM RESERVOIR U.S. ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.09	364.13	0.00	189.	48.	0.00	18.50	0.00
.50	369.82	.22	390.	585.	1.80	17.30	0.00
1.00	370.81	1.21	449.	3708.	3.20	16.20	0.00

FLOOD HYDROGRAPH PACKAGE (HEC-1)
DATA SAFETY VERSION JULY 1978
LAST MODIFICATION 01 APR 80

EOL.
E>

1.00 2446. 364.6 15.70
SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1	ELEVATION STORAGE OUTFLOW	INITIAL VALUE 363.00 149. 0.	SPILLWAY CREST 363.00 149. 0.	TOP OF DAM 369.60 362. 449.	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
RATIO OF PMF	MAXIMUM RESERVOIR U.S. ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS			
.13	364.91	0.00	52	0.00	18.40	0.00			
.50	370.06	.46	873.	2.20	16.50	0.00			
1.00	371.07	1.47	5197.	3.30	15.90	0.00			

1XXXXXXXXXXXXXXXXXXXXX
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION JULY 1978
LAST MODIFICATION 01 APR 80
XXXXXXXXXXXXXXXXXXXXX
EOL.
E)

[illegible]

1

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1

ELEVATION STORAGE OUTFLOW	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM	TIME OF FAILURE HOURS
	363.00	363.00	369.50	
	149.	149.	382.	
	0.	0.	449.	

RATIO OF PMF	MAXIMUM RESERVOIR U.S.ELEV	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS
.00	364.01	185.	48.	0.00	18.40
.50	368.89	357.	271.	0.00	18.40
1.00	370.42	424.	1871.	3.00	16.40

1*****
FLOOD HYDROGRAPH PACKAGE (NEC-1)
DAM SAFETY VERSION JULY 1978
LAST MODIFICATION 01 APR 80

EOI.
E>

A1	MARYS CREEK DAM #8
A2	SHELBY CO.
A3	ANC III
B	6
B1	5
J	1
J1	0.133
K	0
K1	1
N	29.7
P	101
T	102
U	0.250
X	1
X1	1.5
K	2
K1	ROUTING THROUGH MARYS CREEK
Y	1
Y1	1
V1	364
V4	363
V5	48
V5	149
S5	0
SE	348
SE	363
S8	3.1
SD	369.6
SL	550
SL	1120
SU	370.5
SU	371
K	99

163.

1

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1

ELEVATION STORAGE OUTFLOW	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM	TIME OF FAILURE HOURS
	363.00	363.00	369.60	
	149.	149.	382.	
	0.	0.	449.	
RATIO OF PMF	MAXIMUM RESERVOIR U.S.ELEV	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS
.13	364.71	200.	49.	0.00
.50	369.25	369.	333.	0.00
1.00	370.67	439.	2049.	3.00

XXXXXXXXXXXXXXXXXXXX
 FLOOD HYDROGRAPH PACKAGE (HEC-1)
 DAM SAFETY VERSION JULY 1978
 LAST MODIFICATION 01 APR 80
 XXXXXXXXXXXXXXXXXXXX
 EOI.
 E)

HYDRAULIC AND HYDROLOGIC ANALYSIS

According to OCE guidelines, Stotts Dam must be able to safely pass a minimum of the one-half Probable Maximum Flood ($\frac{1}{2}$ PMF). Six hour rainfall depths for the Probable Maximum Precipitation and the 100 year rainfall were obtained from the U. S. Weather Service's Technical Paper 40. Flood routings were performed using the HEC-1-DB computer program. The program uses the dimensionless hydrograph technique described in Section 4 of the Soil Conservation Service National Engineering Handbook and the modified puls method of reservoir routing.

The peak outflow from the $\frac{1}{2}$ PMF (AMC II) is 202 cfs. This flood overtops the dam by 0.2' for 30 minutes.

Stotts Lake Dam

SUMMARY OF ROUTINGS

EVENT	ANTECEDENT MOISTURE CONDITION	
	II	III
PMF	Overtops by maximum of 1.0' for 2.1 hours	Overtops by maximum 1.1' for 2.2 hours
$\frac{1}{2}$ PMF	Overtops by maximum 0.2' for 30 minutes	Overtops by maximum 0.3' for 0.7 hours
100 - YEAR	1.3' of freeboard is maintained	1.0' of freeboard is maintained

Spillway is inadequate to pass the $\frac{1}{2}$ PMF by:

50 cfs (AMC II)
95 cfs (AMC III)

CURVE NUMBER & LAG TIME DETERMINATION FOR STUTTS

PMP = 29.7"

LAND USE: 18% WOODED

2% RESIDENTIAL OR HARD SURFACE

16% WATER

64% PASTURE

<u>R</u>	<u>CN</u>	<u>C</u>
50		72
75		92
100		100
62		75

SOIL TYPES

HYDROLOGIC SOIL GROUP

25% GRENADA

C

60% MEMPHIS

B

15% LORING

3

$$\begin{aligned}
 CN &= 0.18 [0.75 (60) + 0.25 (75)] + \\
 & 0.62 [0.75 (75) + 0.25 (82)] + \\
 & 0.64 [0.75 (62) + 0.25 (75)] + \\
 & 0.16 [100]
 \end{aligned}$$

$$= 73 \text{ (4th I)}$$

$$= 96 \text{ (4th II)}$$

$$1000000 \text{ (4th I)} = 1200'$$

$$LAG = \frac{1.49 (S + 1)^{0.7}}{1900 Y^{0.5}}$$

$$S = \frac{10.2}{1.49} - 10$$

$$LAG = \frac{1200^{0.7} (4.05 - 1)^{0.7}}{1900 (15.5)^{0.5}}$$

$$= 0.202 \text{ hrs. (4th I)}$$

$$= 0.127 \text{ hrs. (4th II)}$$

SPILLWAY RATING FOR STOTTS

ELEV. (MSL)	AREA (D')	STORAGE (AC-FT)
371.9	0	0
387	6.6	40
390	9.2	64
400	13.3	206

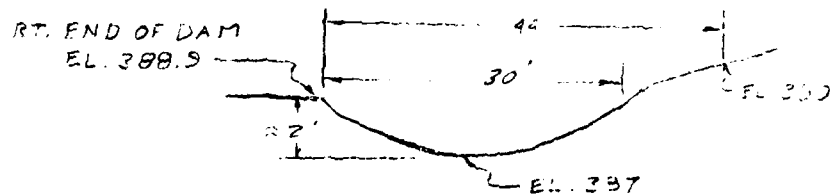
ASSUMING PARABOLIC CROSS-SECT. FROM ELEV. 387 TO 399

USE EQUATION FOR CRITICAL DEPTH IN PARABOLIC CHANNEL FROM 2-391

$$Q_{par.} = 2.005 T H_{cr}^{3/2}$$

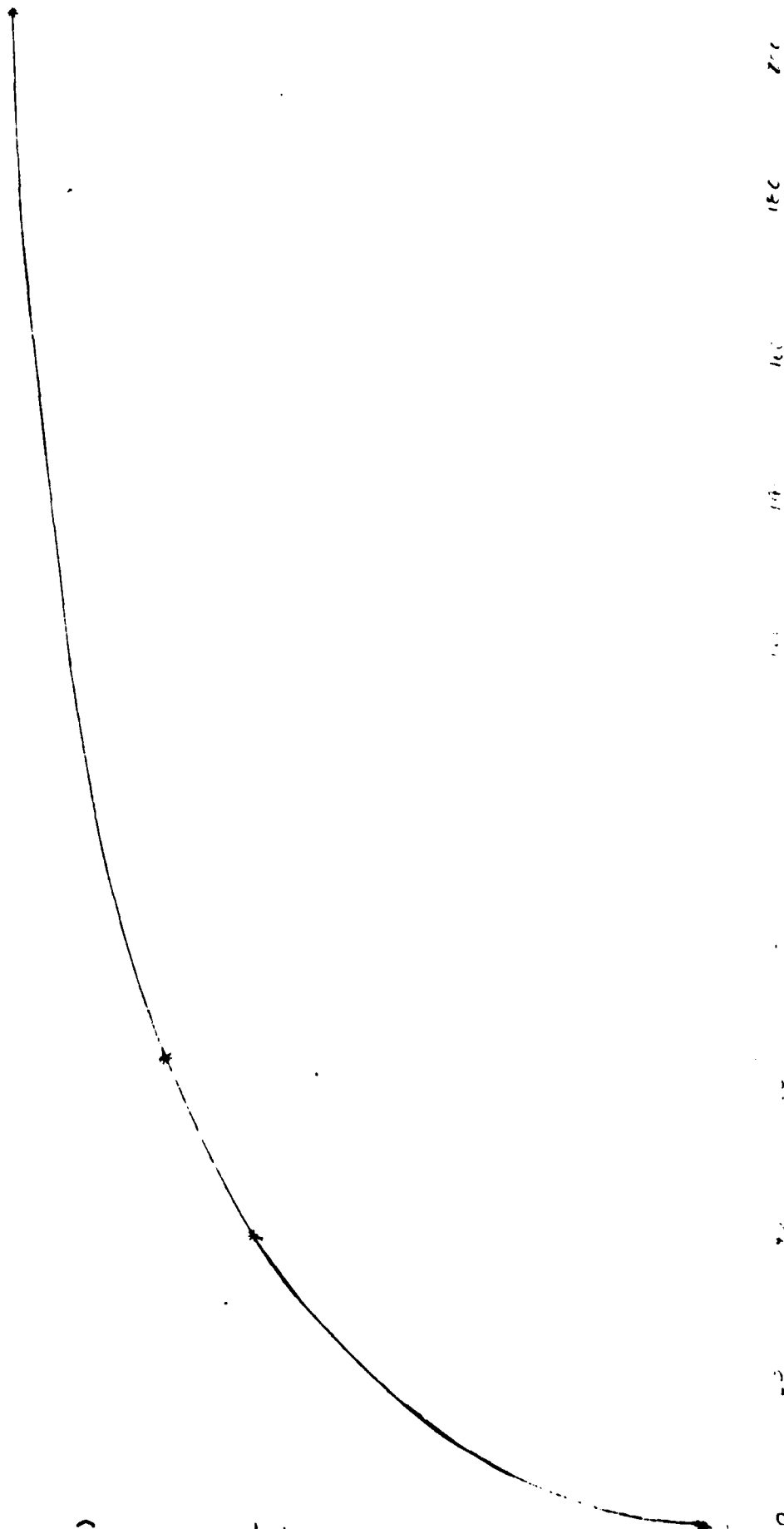
$$Q_{irr.} = \sqrt{\frac{g A^3}{T}}$$

LK. F.L.	H _{cr.}	T	Q (CFS)	A (D')
387	0	0	0	
387.9	0.9	17.5	25	
399	2	32.5	173	
390	3	44	567	76
391	4	44*	1124	120



* ASSUMING THAT AT ELEVATIONS OVER 390 THE SPILLWAY STOP
STOPS INCREASING. A FLOOD CURVE WOULD BE OBTAINED AT EL. 390
BY EXTENDING THE DATA OF THE SPILLWAY TO EL. 390.
THIS IS INCONSEQUENTIAL IN THIS CASE SINCE THE SPILLWAY
WAS RATED FOR ELEVATIONS UP TO 390 ONLY.

STOTTS LAKE DAM STAGE vs. STORAGE



STOTT'S LK. DAM
SPILLWAY RATING
LAKE EL. VS. Q

290

LK. EL.
(MSE)

285

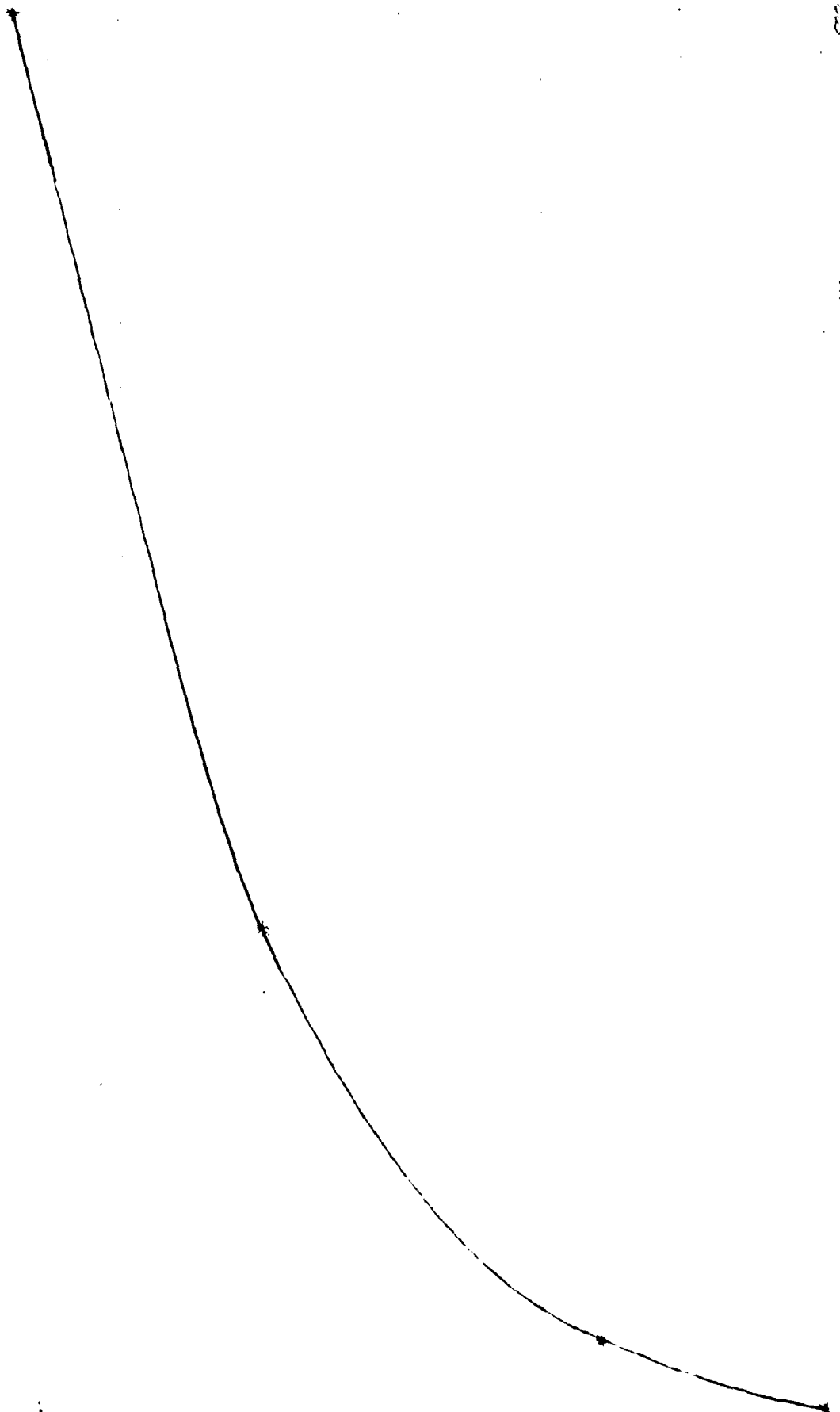
280

275

Q (CFS)

500

1000



A1	STOTTS LAKE DAM				
A2	SHELBY CO.				
A3	REC II	6			
B					
C	100				
D					
E	5				
F	1				
G	0.103				
H	0.5				
I	1				
J	0.1				
K	0.064				
L	1				
M					
N					
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LP					
LQ					
LR					
LS					
LT					
LU					
LV					
LW					
LX					
LY					
LZ					
MA					
MB					
MC					

RUN DATE: 81/05/18:
TIME: 14.21.52:

STOTTS LAKE DAM
SHELBY CO.
ANC II

JOB SPECIFICATION									
NO	NHR	NMIN	IDAY	IMR	IMIN	METRC	IPLT	IPRT	INSTAN
100	0	6	0	0	0	0	0	4	0
			JOPER	NUT	LROPT	TRACE			
			5	0	0	0			

MULTI-PLAN ANALYSES TO BE PERFORMED
NPLAN= 1 NRTIO= 3 IRTIO= 1

RTIOS- .10 .50 1.00

XXXXXXXXXXXXXXXXXXXX

XXXXXXXXXXXXXXXXXXXX

XXXXXXXXXXXXXXXXXXXX

XXXXXXXXXXXXXXXXXXXX

XXXXXXXXXXXXXXXXXXXX

SUB-AREA RUNOFF COMPUTATION

INFLOW HYDROGRAPH COMPUTATIONS FOR STOTTS

ISTAQ	1	ICOMP	0	IECON	0	ITAPE	0	JFLT	1	JPRF	0	INAME	1	ISTAGE	0	IAUTO	0
IHWG	2	TAREA	.06	SNAP	0.00	HYDROGRAPH DATA											
				TRSDA	.06	TRSPC	1.00	RATIO	0.000	ISNOU	0	ISAME	1	LOCAL	0		
				PRECIP DATA													
SPFE	0.00	PMS	29.70	R6	100.00	R12	101.00	R24	102.00	R48	0.00	R72	0.00	R96	0.00		

MO.DA	HR.MM	PERIOD	RAIN	EXCS	LOSS	END-OF-PERIOD FLOW COMP 0	HR.MM	PERIOD	RAIN	EXCS	LOSS	COMP 0
<div> <div>SUM</div> <div>30.29 25.89 4.40 10077.0</div> <div>(769.) (658.) (112.) (302.34)</div> </div>												

XXXXXXXXXXXXXXXXXXXXXXXXXXXX

HYDROGRAPH ROUTING

ROUTING FLOW THROUGH STOTTS

ISTAG	2	ICOMP	1	IECON	0	ITAPE	0	JPLT	1	JPART	0	INME	1	ISTAGE	0	I AUTO	0
CLOSS	0.000	AVG	0.00	INES	1	ROUTING DATA		IOPT	0	IRMP	0			LSTR	0		
NSTPS	1	NSTBL	0	LAG	0	ANSKX	0.000	X	0.000	TSK	0.000	STORA	-387.	ISPRNT	-1		

STAGE	387.00	387.00	388.00	390.00	391.00
FLOW	0.00	25.00	173.00	567.00	1124.00
CAPACITY=	0.	40.	64.	206.	
ELEVATION=	372.	387.	390.	400.	

CREL	SPUD	COQU	EXPU	ELEV	COOL	CAREA	EXPL
387.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TOPEL	DAF DATA	DAFID
	COORD	EXPD

HYDROGRAPH AT	1	.06	.10	.50	1.00
ROUTED TO	1	(.17)	78. (2.22)	388. (10.77)	761. (21.55)
	2	(.17)	18. (.52)	202. (5.71)	612. (17.33)

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1	ELEVATION STORAGE OUTFLOW	INITIAL VALUE 387.00 40. 0.	SPILLWAY CREST 387.00 40. 0.	TOP OF DAM 388.90 55. 161.	DURATION OVER TOP HOURS	MAXIMUM OUTFLOW CFS	MAXIMUM STORAGE AC-FT	MAXIMUM DEPTH OVER DAM	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
RATIO OF PMF	MAXIMUM RESERVOIR U.S.ELEV	0.00	18.	0.00	0.00	202.	45.	0.00	16.60	0.00
.10	387.50	.17	202.	.50	2.10	612.	56.	16.00	16.00	0.00
.50	389.07	.97	612.	63.			63.	15.90	15.90	0.00
1.00	389.67									

FLOOD HYDROGRAPH PACKAGE (MEC-1)
 DAM SAFETY VERSION JULY 1978
 LAST MODIFICATION 01 APR 80
 EOI.
 E)

APPENDIX G
CORRESPONDENCE



TENNESSEE DEPARTMENT OF CONSERVATION
DIVISION OF WATER RESOURCES
4721 TROUSDALE DRIVE, NASHVILLE 37220
615/741-6880

Certified

December 1, 1980

Mr. L. E. Bryan
1371 West Crestwood Dr.
Memphis, TN 38117

Dear Dam Owner:

As provided by the State Safe Dams Act, Tennessee Code Annotated, Sections 70-2501 to 70-2530, non-federal dams in Tennessee must be inspected and certified for safety by our agency. According to our records, you are identified as the owner of Mary's Creek #8 Dam, located in Shelby County, Tennessee. Enclosed for your information and review is a copy of our inventory record on the structure along with a copy of the Act and adopted rules and regulations.

Tentative plans are to schedule a safety inspection of your dam within the next few months. A staff engineer will very shortly be in further communication with you to discuss the pending inspection and your responsibilities under the Safe Dams Act. Your immediate attention, however, is called to the matter of maintaining the earthen dam with a good grass cover and clear of all brush, undergrowth and tree growth. If these conditions do not presently exist, please make plans to remove the brush, undergrowth and all trees less than two inches in diameter as soon as possible. Larger trees may have to be removed at a later date but must be done so under the direction of an experienced engineer.

Please let me, or our Chief Engineer, Mr. Ed O'Neill, know of any assistance we might be.

Very truly yours,

A handwritten signature in dark ink, appearing to read "Robert A. Hunt", is written over the typed name.

Robert A. Hunt, P.E.
Director, Division of Water Resources

RAH:lt

Enclosures

ORNED-G

NON-FEDERAL DAM INSPECTION REVIEW BOARD
PO BOX 1070
NASHVILLE, TENNESSEE 37202

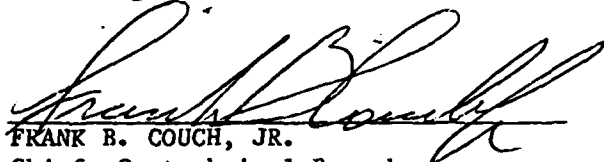
Commander, Nashville District
US Army Corps of Engineers
PO Box 1070
Nashville, TN 37202

1. The Interagency Review Board, appointed by the Commander on 19 June 1981, presents the following recommendations after meeting on 30 July 1981, to consider the Phase I investigation report on Mary's Creek Watershed Dam No. 8, inspected by the Tennessee Department of Conservation.
2. The data relating to the failure of Stott's Dam through structural failure alone or through failure during the $1/2$ PMF should be included in the report.
3. The report should conclude that the dam would probably not fail if it were overtopped by 0.2 ft for 1.8 hours during the $1/2$ PMF.
4. A qualified engineer should be engaged to perform an embankment stability analysis to determine if the dam meets seismic stability requirements.
5. Recommendation "d" should be revised to include the services of a qualified engineer to investigate the feasibility of lowering the water level in the stilling basin. The engineer should also investigate and make recommendations for the repair of the drawdown facilities.

ORND-G

Commander, Nashville District
US Army Corps of Engineers

6. The Board is in agreement with other report conclusions and recommendations following minor revisions.



FRANK B. COUCH, JR.
Chief, Geotechnical Branch
Chairman



O'GENE W. BARKEMEYER
State Conservation Engineer
Soil Conservation Service



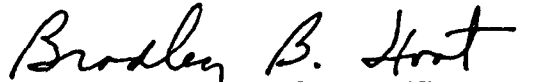
GEORGE MOORE
Alternate, Division of Water Resources
State of Tennessee



H. F. PHILLIPS
Chief, Hydraulics Section
Alternate, Hydrology and Hydraulics
Branch



EDWARD B. BOYD
Hydrologic Technician
Alternate, US Geological Survey



BRADLEY B. HOOT
Chief, Structural Section
Alternate, Design Branch